The Bioscan
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
21(1) 2440-2443, 2026 www.thebioscan.com

Combined Efficacy of Instrument-Assisted Soft Tissue Mobilization and Extracorporeal Shockwave Therapy in Myofascial Pain Syndrome Associated with Knee Osteoarthritis: A Case Report

Sanhita Sengupta[1], Gaijilung Dangmei[1*], Glory Dangmei[2], Pritam Das[3], Md Olive Rahaman[3]

[1]Assistant Professor, Department of Allied Health Sciences, Brainware University, Barasat, Kolkata, 700125, India

[2]Assistant Professor, Department of Physiotherapy, Aditya College of Physiotherapy & Health Sciences, A.M.C Road D Block, Bordoloi Avenue, Aditya Diagnostic and Hospitals Campus, Assam, 786005, India

[3]Physiotherapy Student, Department of Allied Health Sciences, Brainware University, Barasat, Kolkata, 700125, India

Corresponding Author: Gaijilung Dangmei, gd.ah@brainwareuniversity.ac.in

DOI: https://doi.org/10.63001/tbs.2026.v21.i01.pp2440-2443

KEYWORDS
Case report, Extracorporeal shockwave therapy, Instrument-Assisted Soft Tissue Mobilization, Osteoarthritis, Myofascial pain syndrome, Trigger Points

Received on:28-02-2026
Accepted on: 19-03-2026

Published on: 31-03-2026

Abstract

Knee osteoarthritis (KOA) is a progressive degenerative condition associated with pain, stiffness, and functional limitations, particularly in older individuals. Myofascial pain syndrome (MPS), characterized by the presence of trigger points (TrPs), significantly contribute to pain and disability in KOA. This case report is the first to report the combined effect of Instrument-Assisted Soft Tissue Mobilization (IASTM) and Extracorporeal Shock Wave Therapy (ESWT) in the treatment of myofascial pain syndrome associated with KOA. The patient was a 52-year old female with knee pain and TrPs around affected hamstrings and quadriceps muscle, reduced muscle strength, and difficulty in performing daily functional activities. The intervention consisted of IASTM and ESWT, administered three times per week for a duration of four weeks. Baseline assessment was taken for pain intensity, muscle strength, high-sensitivity C-reactive protein (hs-CRP), and functional activity. Following the treatment period, the patient showed considerable improvements in pain intensity, muscle strength, and functional performance. These findings suggest that, integration of IASTM and ESWT may be an effective treatment approach for managing myofascial pain syndrome associated with KOA.

1.INTRODUCTION

Arthritis is joint inflammation causing pain and movement issues, with osteoarthritis (OA) being the most common type, mainly affecting knees and hips. Recent research has connected muscle pain in Knee OA (KOA) to myofascial trigger points (MTrPs) in adjacent muscles. [1] MTrPs can limit movement, with 11% to 50% prevalence in knee muscles, especially affecting hamstrings and quadriceps.[2] This is the first case report to investigate MTrPs-related pain in KOA, which is often neglected, and evaluated the effects of Instrument-assisted soft tissue mobilization (IASTM) and Extracorporeal shockwave therapy (ESWT) on hs-CRP, pain, muscle strength, and functional activity.

2. CASE DESCRIPTION

A 52-year-old female arrived at the physiotherapy clinic with severe right knee pain, struggling to rise from chairs, climb stairs, and walk. Her pain began suddenly five months ago while getting up from a seated position. She has type 2 diabetes and has been on medication for a decade. She experiences severe knee pain that worsens with stairs, prolonged sitting, or standing. It eases with ice application and avoiding sustained knee flexion. On her initial assessment, she rated her pain as seven out of ten and experienced sleep disturbances. Clinical observation revealed an endomorphic body type with swelling in the right knee's anteromedial region but no deformity. Gait analysis showed decreased walking speed and limited weight-bearing on the right side. Palpation indicated increased temperature in the right popliteal fossa and G3 tenderness in the anteromedial area, along with trigger points in the quadriceps and hamstrings. Crepitus occurred during knee movement. Active knee flexion was slightly restricted, and passive motion was painful at the end range. Strength testing indicated right quadriceps strength at 90.8 N and right hamstring strength at 52.4 N, measured using a Hand-held dynamometer. The patient had significant functional limitations, with a WOMAC score of 68 out of 96. Blood tests showed an elevated hs-CRP level of 2.9 gm/dL. X-

rays of the right knee indicated medial joint space narrowing and osteophytes. The patient was diagnosed with Myofascial pain syndrome associated with KOA. Written informed consent was obtained from the patient for publication of this case report.

3. PHYSIOTHERAPY INTERVENTION

The treatment sessions occurred three times a week for four weeks, incorporating extracorporeal shockwave therapy (ESWT) and instrument-assisted soft tissue mobilization (IASTM). ESWT targeted trigger points in the hamstring and quadriceps muscles while the patient was positioned prone and supine, delivering 4000 pulses at 2.2 bars and 6 Hz. IASTM was applied at a 45-degree angle using sweeping and fanning techniques over the trigger points, preceded by a hydrocollator pack for 5 minutes and followed by an ice pack for 15 minutes to minimize inflammation. Additionally, the patient received a home exercise program featuring isometric strengthening for the quadriceps, hamstrings, and VMO (ten-second holds for ten reps) along with hamstring stretches (30-second holds for three reps).

3. RESULTS

a. Muscle Strength

Figure 1 represents the improvement of quadriceps and hamstring muscle strength after completion of treatment.

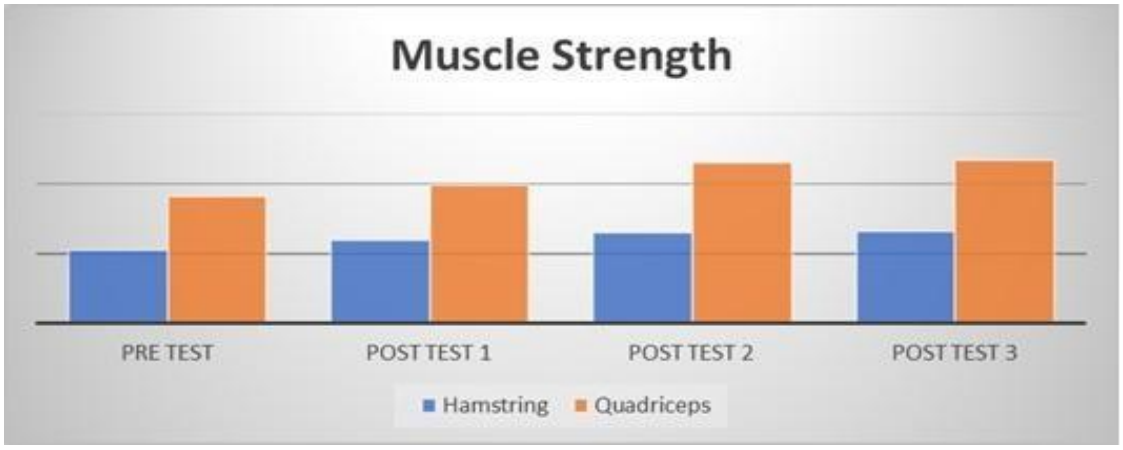

Fig 1: Pre-intervention and post-intervention changes in hamstring and quadriceps muscle strength, measured using hand-held dynamometer

b. Pain Scoring

Figure 2 shows NPRS scores from Day 1 to Day 30, with pain decreasing from 7/10 to 0/10, where 0 denotes no pain and 10 denotes severe pain).

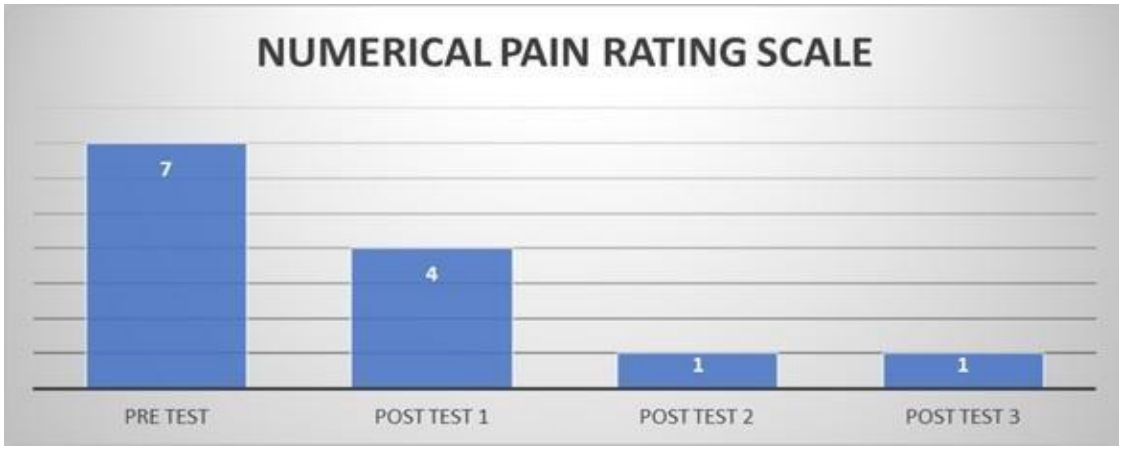

Fig 2: Pre- and post-intervention changes in pain intensity in KOA, measured using the Numerical pain rating scale

c. Functional Ability

Figure 3 shows patient functional improvement before and after intervention on the WOMAC scale

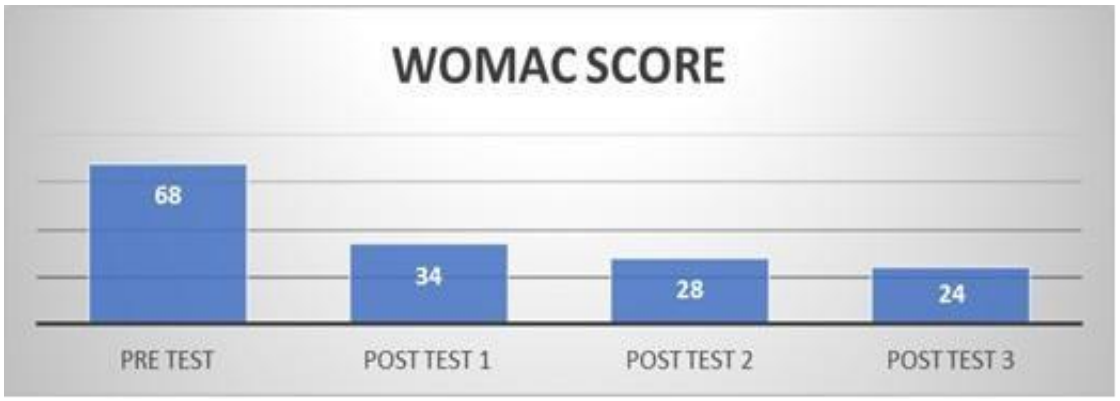

Fig 3: Pre- and post-intervention changes in WOMAC scoring in KOA patient

d. Tenderness

Figure 4 shows tenderness reduction during the treatment. On Day 1, tenderness was G3, while by Day 30, it improved to G1, indicating a positive response to the treatment.

Fig 4: Pre- and post-intervention changes in tenderness grade in KOA patient, measured using Hutchinson's method

e. High-sensitivity C-reactive protein (hs-CRP)

The hs-CRP decreased from 2.9 mg/L to 0.4 mg/L by day 30 of treatment, with a normal range of <1.5 mg/L. Figure 5 shows the changes in hs-CRP levels measured by the Immunoturbidimetry method.

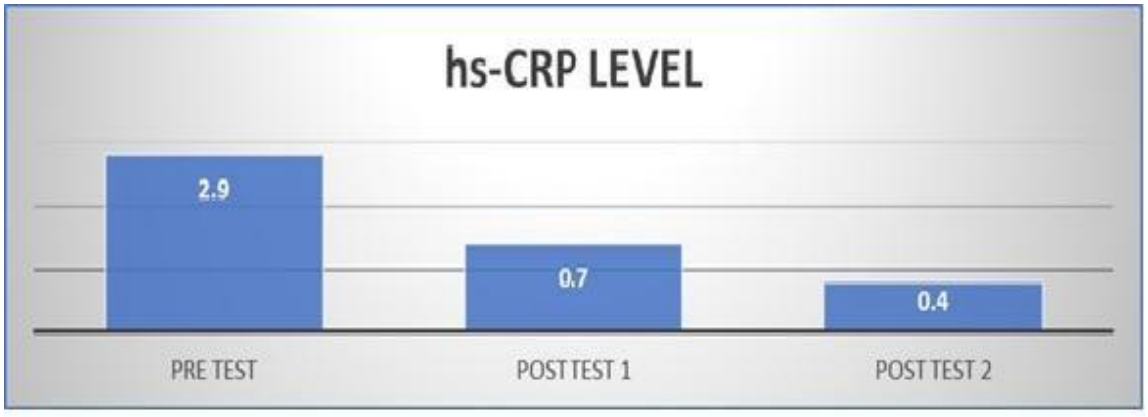

Fig 5: Pre- and post-intervention changes hs-CRP level. hs-CRP is an inflammatory marker and is elevated in patients with KOA and is also associated with myofascial pain syndrome

The pain intensity of the MTrPs in the taut bands decreased, and the taut bands in the affected muscles were reduced.

4. DISCUSSION

This case report showed that combining Instrument-Assisted Soft Tissue Mobilization (IASTM) with Extracorporeal Shock Wave Therapy (ESWT) markedly improved pain, muscle strength, function, and hs-CRP levels in a grade 2 Knee Osteoarthritis (KOA) patient.

KOA involves cartilage breakdown and pain, with myofascial trigger points playing a significant role in patients' dysfunction and discomfort. Dor et al. (2017) noted that MTrPs contribute to pain and muscle weakness, potentially affecting KOA progression.

[3]. Inactivating MTrPs may aid in OA treatment due to their role in muscle dysfunction.[4]

In this case study, pain and tenderness in a KOA patient decreased from baseline, likely due to the neuromodulatory effects of IASTM and ESWT. IASTM promotes tissue healing and enhances circulation, effectively reducing pain signaling. In contrast, ESWT modulates pain pathways by stimulating substance P, facilitating cellular repair and leading to significant pain reduction, as shown in our study. Together, these therapies enhance musculoskeletal recovery, alleviate pain, and improve joint function and muscle engagement.

The present case report found that the combined application of IASTM and ESWT likely contributed to significant improvements in WOMAC scores. Arno et al. suggested that improvements in function after ESWT result from its analgesic effects, increased tissue perfusion, growth factor stimulation, and anti-inflammatory actions. [6] This combined approach likely reduced joint stiffness, improved mobility, and enhanced overall joint function, thereby leading to a significant improvement in WOMAC scores.

In addition to its mechanical effects, IASTM influences inflammatory markers associated with OA progression. A.E. Kozijn et al. identified CRP as a key factor in metabolic OA aggravation due to its role in cartilage degradation and osteophyte formation.[7] MPS can elevate hs-CRP levels.[8] Studies found that IASTM can reduce the hs-CRP level in patients with MPS.[9] Reduced hs-CRP levels suggest that combined IASTM and ESWT therapies may alleviate systemic inflammation, potentially easing pain and slowing osteoarthritis progression.

In this case report, muscle strength was improved post-treatment. Pain-related muscle inhibition is a common consequence of KOA,[10] and reducing pain may have a positive impact on strength improvement.

The case report found that IASTM combined with ESWT enhances pain relief, function, and muscle strength in KOA, but its single-patient design and short follow-up indicate the need for larger studies.

Acknowledgement

We are thankful to the subject who participated in this case study and to the Brainware University where the study was conducted.

Conflict of Interest : None

Abbreviations

OA- Osteoarthritis

KOA- Knee osteoarthritis

ESWT- Extracorporeal shockwave therapy

IASTM- Instrument assisted soft tissue mobilization

MTrPS- Myofascial trigger points

NPRS- Numerical pain rating scale

VMO-Vastus medialis oblique

WOMAC- Western Ontario and McMaster Universities Osteoarthritis Index

5. REFERENCES

- Sánchez Romero EA, Fernández-Carnero J, Calvo-Lobo C, Ochoa Saez V, Burgos Caballero V, Pecos-Martín D. Is a combination of exercise and dry needling effective for knee OA? Pain Medicine. 2020 Feb 1;21(2):349-63. DOI:https://doi.org/10.1093/pm/pnz036
- Yoosefinejad AK, Samani M, Jabarifard F, Setooni M, Mirsalari R, Kaviani F. Comparison of the prevalence of myofascial trigger points of muscles acting on knee between patients with moderate degree of knee osteoarthritis and healthy matched people. Journal of Bodywork and Movement Therapies. 2021 Jan 1;25:113-8. DOI:https://doi.org/10.1016/j.jbmt.2020.10.012
- Dor A, Kalichman L. A myofascial component of pain in knee osteoarthritis. Journal of bodywork and movement therapies. 2017 Jul 1;21(3):642-7. DOI:https://doi.org/10.1016/j.jbmt.2017.03.025
- Lin X, Li F, Lu H, Zhu M, Peng TZ. Acupuncturing of myofascial pain trigger points for the treatment of knee osteoarthritis: A systematic review and metaanalysis. Medicine. 2022 Feb 25;101(8): e28838. DOI:10.1097/MD.0000000000028838
- Ochiai N, Ohtori S, Sasho T, Nakagawa K, Takahashi K, Takahashi N, Murata R, Moriya H, Wada Y, Saisu T. Extracorporeal shock wave therapy improves motor dysfunction and pain originating from knee osteoarthritis in rats. Osteoarthritis and cartilage. 2007 Sep 1;15(9):1093-6. DOI:https://doi.org/10.1016/j.joca.2007.03.011
- Arnó A, García O, Hernán I, Sancho J, Acosta A, Barret JP. Extracorporeal shock waves, a new non-surgical method to treat severe burns. Burns. 2010 Sep 1;36(6):844-9. DOI:https://doi.org/10.1016/j.burns.2009.11.012
- Kozijn AE, Tartjiono MT, Ravipati S, van der Ham F, Barrett DA, Mastbergen SC, Korthagen NM, Lafeber FP, Zuurmond AM, Bobeldijk I, Weinans H. Human Creactive protein aggravates osteoarthritis development in mice on a high-fat diet. Osteoarthritis and cartilage. 2019 Jan 1;27(1):118-28. DOI:https://doi.org/10.1016/j.joca.2018.09.007
- Shakouri SK, Dolatkhah N, Omidbakhsh S, Pishgahi A, Hashemian M. Serum inflammatory and oxidative stress biomarkers levels are associated with pain intensity, pressure painthreshold and quality of life in myofascial pain syndrome. BMC research notes. 2020 Dec;13:1-8. DOI:https://doi.org/10.1186/s13104-020-05352-3
- Basak AK, Sengupta S. Combined efficacy of instrument-assisted soft tissue mobilization and muscle energy technique in cervical myofascial pain: A case report. Indian Journal of Physiology and Allied Sciences. 2024 Jun 29;76(02):44-7. DOI:https://doi.org/10.55184/ijpas.v76i02.256
- Ericsson YB, McGuigan FE, Akesson KE. Knee pain in young adult womenassociations with muscle strength, body composition and physical activity. BMC Musculoskeletal Disorders. 2021 Aug 21;22(1):715. DOI:https://doi.org/10.1186/s12891-021-04517-w