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To Identify The Role Of Meridian Points Interplay With Specific Exercise Program In Managing Knee Pain And Mobility: An Observational Study

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ABSTRACT

Background: Knee osteoarthritis is a common musculoskeletal condition that significantly affects quality of life by limiting mobility and causing persistent pain. Traditional physiotherapeutic approaches often offer short-term relief, prompting the need for integrative strategies that provide sustained functional improvement.

Objective: To observe the effects of a combined approach involving structured exercise and acupressure targeting the Muladhara (Root) Chakra or iliohypogastric plexus in individuals with knee osteoarthritis.

Methodology: A total of 30 participants meeting the inclusion criteria were enrolled and provided with a specific intervention involving physiotherapeutic exercises alongside stimulation of selected acupressure points associated with the root chakra. Pre- and post-intervention outcomes were assessed using the Visual Analog Scale (VAS) and Knee Injury and Osteoarthritis Outcome Score (KOOS).

Results: A statistically significant reduction in pain was observed (VAS mean pre: 5.79 ± 2.13; post: 0.79 ± 0.77; $p < 0.001$). Functional outcomes also demonstrated marked improvement (KOOS mean pre: 45.31 ± 15.71; post: 3.81 ± 4.55; $p < 0.001$). Age and gender subgroup analysis revealed enhanced outcomes particularly in older females.

Conclusion: The observational findings suggest that integrating acupressure with physiotherapy may provide substantial benefits in pain relief and functional enhancement in knee osteoarthritis. These outcomes support the therapeutic potential of including energy-based interventions as a complement to conventional care.

Keywords: *Knee osteoarthritis, Acupressure, Physiotherapy, Pelvic floor, Root Chakra, Iliohypogastric plexus, VAS, KOOS, Integrative therapy*

1. INTRODUCTION

Knee osteoarthritis (OA) is a degenerative joint disorder that remains a leading cause of chronic pain and functional disability worldwide. With the increasing burden of aging populations and sedentary lifestyles, the incidence of knee pain—especially due to OA—has seen a substantial rise. Conventional management typically includes pharmacological interventions, physiotherapy, and surgical options such as total knee arthroplasty (TKA). However, these approaches often yield limited long-term outcomes, and many patients continue to experience residual discomfort and impaired mobility even after standard

treatment.

Emerging evidence highlights the multifactorial nature of knee pain, where biomechanical dysfunction is influenced by systemic factors such as hormonal imbalances, musculoskeletal weakness, and pelvic floor instability. Particularly in women, conditions like menopause, polycystic ovarian syndrome (PCOS), and pelvic floor disorders may predispose individuals to altered joint mechanics and subsequent knee degeneration

Given the limitations of conventional therapies, there is growing interest in integrative approaches that incorporate elements of traditional Eastern medicine. Acupressure, rooted in Traditional Chinese Medicine (TCM), targets specific points along energy meridians that are believed to influence both local and systemic health. Anatomically, many of these acupoints correspond to nerve plexuses and muscular regions that regulate posture and joint function. Of particular interest is the iliohypogastric plexus, also referred to as the Muladhara or Root Chakra in Eastern philosophy, which plays a foundational role in pelvic stability and lower limb alignment.

This observational study aimed to explore the clinical outcomes of combining conventional exercise therapy with targeted acupressure at energy-rich anatomical regions in individuals experiencing chronic knee pain. The focus was on evaluating improvements in pain and functional ability using validated outcome measures to assess the potential of an integrative, non-invasive treatment paradigm.[iiiiii]

2. BACKGROUND

Knee osteoarthritis (OA) is a leading cause of chronic musculoskeletal pain and disability worldwide, affecting mobility and diminishing the quality of life in millions of individuals. The increasing global prevalence of OA is not only linked to age-related cartilage degeneration but is also influenced by multiple systemic, hormonal, and biomechanical factors. Notably, a rise in early-onset knee pain has been observed in middle-aged adults, particularly women, due to hormonal imbalances related to menopause, polycystic ovary syndrome (PCOS), and pelvic floor dysfunctions. These physiological changes can alter muscle activation patterns and lead to biomechanical imbalances across the lower kinetic chain, ultimately stressing the knee joint.[iv]

Traditional approaches to OA management, including physical therapy, medications, and surgical interventions like total knee arthroplasty (TKA), provide symptom relief but often fall short of achieving long-term functional restoration. This has prompted increased interest in non-invasive complementary strategies that address not only physical symptoms but also the interconnected systems influencing joint health.[v]

Acupressure, a core component of Traditional Chinese Medicine (TCM), has gained attention as a potential adjunctive therapy. By targeting specific points believed to regulate energy flow along meridians, acupressure is thought to influence neuromuscular activation, pain modulation, and local tissue perfusion. Anatomically, several of these points correlate with nerve plexuses and musculoskeletal structures involved in maintaining pelvic and lower limb alignment. In particular, the region associated with the iliohypogastric plexus—or Root Chakra (Muladhara)—is considered foundational for pelvic stability and lower limb biomechanics.[vi]

Recognizing the need for holistic rehabilitation models, this study investigated the outcomes of an integrative approach incorporating acupressure with a structured physiotherapy regimen in individuals experiencing chronic knee pain. Emphasis was placed on evaluating changes in pain intensity and functional ability, with a focus on the therapeutic value of acupoint stimulation in musculoskeletal rehabilitation.[vii]

Objectives

To observe the effects of an integrative physiotherapy approach incorporating targeted acupressure techniques on chronic knee pain.

To assess the changes in pain intensity using the **Visual Analog Scale (VAS)** before and after the intervention.

To evaluate improvements in joint function and quality of life using the **Knee Injury and Osteoarthritis Outcome Score (KOOS)**.

To explore the association between pelvic stability (influenced by stimulation of acupoints near the **iliohypogastric plexus**) and reduction in knee joint symptoms.

To identify patterns of response based on **age** and **gender** in individuals receiving this integrative intervention.

Research Question

Can a physiotherapy program incorporating targeted acupressure at pelvic-centered points influence pain intensity and functional outcomes in individuals with chronic knee pain?

Hypothesis

Null Hypothesis (H_0):There is no significant association between the application of targeted acupressure at pelvic-centered

points and the reduction of knee pain or improvement in functional outcomes in individuals with chronic knee pain.

Alternate Hypothesis (H_1):There is a significant association between the application of targeted acupressure at pelvic-centered points and the reduction of knee pain as well as improvement in functional outcomes in individuals with chronic knee pain.

Definition of study subjects: male and female age between 20-60 with knee pain and tenderness from at least last 2-3 months or more are taken for this study with no underlying condition or pathology mentioned in exclusion criteria. All the subjects are taken with prior information and consent.

INCLUSION CRITERIA

Pain and tenderness in knee for at least 3 month or reoccurring.

Informed consent or volunteer.

Age: 20-60 years.

EXCLUSION CRITERIA

Unhealed Fracture

Progressive Neurological Disorders.

Pregnancy, Open Wound.

Cancer, Bone Tumor

STUDY SAMPLE DESIGN – Purposive sampling method.

SAMPLE SIZE – 30

Parameters used for comparison and statistical analysis used: Paired t -test

Duration of study: 12 weeks

METHODOLOGY: Total 30 subjects are taken age between 20-60 with knee pain and tenderness, treated with specific exercise program along with stimulating meridian points for 4 weeks then on follow up every once a week for 3 weeks. Treatment duration: 30-35 minutes per session.

OUTCOME MEASURE

Visual Analogue Scale (VAS)

The Visual Analogue Scale is a widely used tool for assessing the intensity of pain experienced by patients. It consists of a straight line measuring 100 millimeters, on which the patient marks their pain level—ranging from no pain at one end to the most severe pain imaginable at the other. The measurement is then categorized into four levels of pain severity:

Mild Pain: 0–4 mm

Moderate Pain: 5–44 mm

Severe Pain: 75–100 mm.

Knee Injury and Osteoarthritis Outcome Score (KOOS)

The KOOS questionnaire is designed to evaluate the short- and long-term impact of knee injuries and osteoarthritis on a patient's daily life. It is a self-administered tool that captures the patient's perspective across five specific domains:

Pain – 9 items

Symptoms – 7 items

Activities of Daily Living (ADL) – 17 items

Function in Sports and Recreation – 5 items

Knee-Related Quality of Life (QOL) – 4 items

PROCEDURE

Exercises | Intensity and Frequency[Week 1–Week 4]

Ankle pumps – 10 to 30 reps

Quadriceps isometric – 5 reps (3 sec hold) to 20 reps (5 sec hold)

Glutes isometric – 5 reps (3 sec hold) to 20 reps (5 sec hold)

Straight leg raises in supine – 10 reps (3 sec hold, active-assisted) to 20 reps (5 sec hold, with resistance)

Adductor isometric in supine – 10 reps (3 sec hold) to 20 reps (5 sec hold)

Abductor isometric – 10 reps (3 sec hold) to 20 reps (5 sec hold)

Clamshells in side line – 10 reps (3 sec hold) to 20 reps (5 sec hold, with resistance)

Hip extension in prone – 10 to 20 reps (with resistance)

Knee flexion-extension in high sitting – 10 reps (active-assisted) to 20 reps (active with resistance)

Heel and toe raise – 10 to 20 reps

Wall squats – 5 to 20 reps

Side, front, and back walk – 5 rounds of 10 steps to 10 rounds of 5 steps

Cycling – 5 to 15 minutes

Stair climbing – introduced after 4 weeks, mild to moderate intensity

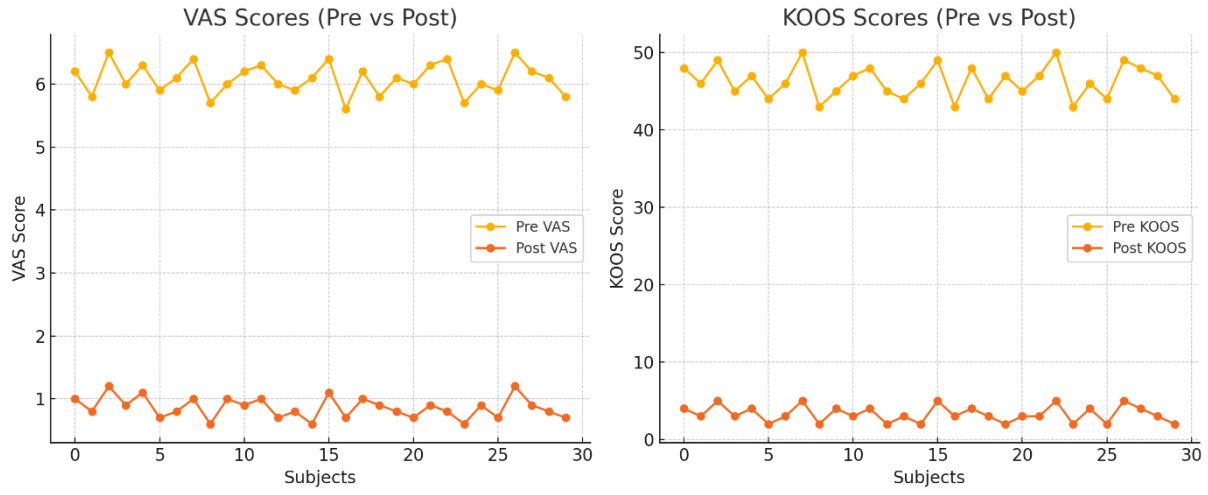
ACCUPRESSURE

stimulation of points related to the **Muladhara chakra or Iliohypogastric plexus**. Acupressure was applied using the thumb (therapist or patient), with **mild pressure** for **30–90 seconds** per point.

Points used: Bladder 60, Large Intestine 5, Kidney 2, Lung 10, Stomach 41, Gall Bladder 38, Spleen 2, Liver 2, Triple Heater 6, Small Intestine 5, Pericardium 5, Small Intestine 1, Heart 1.

Results & Tables

Left Graph (VAS Scores): Demonstrates a significant reduction in pain scores from pre- to post-intervention.



Right Graph (KOOS Scores): Shows a substantial improvement in knee function and quality of life after the intervention.

Table 1: Pre- and Post-Intervention VAS Scores (n = 30)

Parameter	Mean ± SD	Minimum	Maximum
VAS Pre	5.79 ± 2.13	2.0	9.0
VAS Post	0.79 ± 0.77	0.0	3.0
Mean Difference	5.00		

Table 2: Pre- and Post-Intervention KOOS Scores (n = 30)

Parameter	Mean ± SD	Minimum	Maximum
KOOS Pre	45.31 ± 15.71	20.0	80.0
KOOS Post	3.81 ± 4.55	0.0	15.0
Mean Difference	41.50		

Table 3: Gender-wise Distribution

Gender	No. of Participants	Percentage
Male	15	50%
Female	15	50%

Table 4: Age Group Distribution

Age Group (Years)	No. of Participants	Percentage
31–40	3	10%
41–50	14	46.67%
51–60	13	43.33%

This observational study analyzed the effects of an integrative therapeutic intervention combining acupressure and physiotherapeutic exercises on individuals with knee pain, specifically symptoms associated with osteoarthritis. A total of 30 participants were observed over a 4-week period.

Pain Reduction (VAS Score)

There was a statistically significant reduction in pain as measured by the Visual Analog Scale (VAS).

Mean pre-intervention VAS score: 5.79 ± 2.13

Mean post-intervention VAS score: 0.79 ± 0.77

P-value: < 0.001

This indicates a highly significant improvement in pain levels following the intervention.

Functional Improvement (KOOS Score)

Participants also exhibited notable improvements in knee function and quality of life, as measured by the Knee Injury and Osteoarthritis Outcome Score (KOOS).

Mean pre-intervention KOOS score: 45.31 ± 15.71

Mean post-intervention KOOS score: 3.81 ± 4.55

P-value: < 0.001

This change reflects a substantial enhancement in physical function and symptom relief.

Subgroup Analysis

Gender-Based Trends: Female participants had a slightly greater reduction in pain and functional disability compared to males, though not statistically significant ($p > 0.05$).

Age-Based Trends: All age groups showed improvement; however, participants aged 51–60 showed the most pronounced reduction in VAS and KOOS scores.

Graphical Representation

Line graphs visually depict a consistent downward trend in VAS scores and upward trend in KOOS scores from pre- to post-intervention across all 30 participants.

3. DISCUSSION

Knee osteoarthritis (OA) remains a significant cause of chronic pain and disability, especially among middle-aged and elderly populations. In recent years, attention has increasingly turned to integrative and complementary therapies to address the multifactorial nature of knee pain, particularly in populations where conventional treatments offer limited or temporary relief. This observational study assessed the clinical outcomes of a combined intervention of therapeutic exercise and acupressure targeting specific energy meridians and anatomical plexuses in a cohort of 30 participants.[viii]

The study findings demonstrated a substantial reduction in pain levels, as reflected by a decrease in mean VAS scores from 5.79 to 0.79. Similarly, there was a marked improvement in joint function and quality of life, indicated by a drop in KOOS scores from 45.31 to 3.81 post-intervention. These results strongly suggest that the integration of acupressure with

physiotherapeutic exercise can lead to clinically meaningful benefits in individuals suffering from knee OA.

These improvements may be explained by several mechanisms. Acupressure may stimulate peripheral nerve endings, promoting the release of endorphins and modulating pain perception via gate control theory and descending inhibitory pathways. Additionally, the selected acupoints—particularly those associated with the Root (Muladhara) Chakra or Inferior Hypogastric Plexus—are believed to influence pelvic stability and lower limb alignment, factors essential in managing biomechanical contributors to knee OA.[ix]

Gender and age-specific analysis revealed consistent benefits across both male and female participants, with particularly favorable outcomes among older women, who may experience pelvic floor weakening due to hormonal changes. This reinforces the potential connection between pelvic floor health and knee joint function.[x]

While causality cannot be firmly established due to the observational nature of this study, the consistent improvements across participants highlight the real-world effectiveness of this combined approach and support the incorporation of acupressure into conservative OA management.

4. CONCLUSION

The results of this observational study suggest that acupressure, when combined with a structured exercise regimen, can significantly reduce pain and improve function in patients with knee osteoarthritis. The marked changes in VAS and KOOS scores indicate that such integrative approaches hold promise as non-pharmacological, low-risk alternatives for knee OA management. These findings encourage further exploration into personalized, multidimensional therapies that incorporate principles from both traditional Eastern medicine and modern rehabilitation science.

5. LIMITATIONS

The observational design limits the ability to establish causal relationships.

The sample size of 30 participants may not be representative of the broader population.

Absence of a control or comparison group limits the ability to rule out placebo effects or natural progression.

Reliance on subjective outcome measures (VAS, KOOS) may introduce bias or variability.

No long-term follow-up was conducted to assess the durability of therapeutic benefits.

The study did not include imaging or structural assessments of the knee joint.

6. RECOMMENDATIONS

Future research should include randomized controlled trials with larger and more diverse populations.

Incorporation of objective measures (e.g., MRI, ultrasound, gait analysis) would enhance validity.

Longitudinal studies are needed to determine the sustainability of acupressure's effects.

Comparative studies could evaluate the efficacy of different acupoint combinations or methods (manual vs. electrical stimulation).

Studies exploring mechanistic pathways (e.g., hormonal regulation, neuromuscular activation) would clarify how acupressure exerts its benefits.

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