RESEARCH PAPER

Autonomic and Menstrual Symptom Modulation with Meridian Exercise: A Case Report

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ABSTRACT

Background: Primary dysmenorrhea is a common menstrual disorder characterized by cyclic pelvic pain in the absence of identifiable pelvic pathology, often associated with systemic and emotional symptoms.

Case Description: A 22-year-old female with a two-year history of cyclic lower abdominal pain during menstruation was clinically diagnosed with primary dysmenorrhea based on symptom history and regular menstrual cycles. Secondary causes were excluded through the absence of gynecological abnormalities, prior pelvic pathology, or associated clinical red flags. Baseline assessment included the WaLIDD score, Visual Analogue Scale (VAS), and Menstrual Distress Questionnaire (MDQ).

Intervention: A structured meridian exercise program comprising gentle movements, stretching, and controlled breathing was administered over 12 weeks (three menstrual cycles), without pharmacological or lifestyle modifications.

Results: Post-intervention outcomes demonstrated reductions in pain intensity (VAS: 8→4), dysmenorrhea severity (WaLIDD: 7→4), and menstrual distress across all phases of the cycle.

Conclusion: Meridian exercise may serve as a feasible non-pharmacological intervention for primary dysmenorrhea. Further research using larger samples and objective autonomic measures is recommended.

Keywords: Primary dysmenorrhea; menstrual pain; meridian exercise; autonomic modulation; non-pharmacological intervention, case report.

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Introduction

Primary dysmenorrhea is a common menstrual condition affecting adolescents and young adult women, marked by recurrent cramp-like pelvic pain in the absence of underlying pelvic disease[1]. Along with pain, many individuals report associated symptoms such as fatigue, nausea, headaches, sleep disturbances, and emotional fluctuations, which can negatively influence academic functioning and overall quality of life[2]. Although nonsteroidal anti-inflammatory drugs (NSAIDs) remain the most frequently prescribed treatment, their prolonged use may be restricted by side effects and suboptimal symptom control[3].

The condition has traditionally been explained by increased prostaglandin production leading to excessive uterine contractions and reduced uterine blood flow[4]. However, current perspectives in pain science advocate a more comprehensive biopsychosocial framework, emphasizing the role of central pain modulation and autonomic nervous system involvement. Research indicates that individuals with primary dysmenorrhea often exhibit heightened sympathetic activity alongside reduced parasympathetic regulation, which may contribute to increased pain sensitivity and accompanying systemic symptoms[4,5].

In recent years, exercise-based and mind–body approaches have gained attention for their role in pain regulation through neuromodulatory effects, relaxation responses, and autonomic balance. Interventions including aerobic exercise, stretching, and integrative movement practices have been shown to reduce menstrual pain and distress[6,7]. Meridian-based exercises, incorporating gentle movements, stretching, and controlled breathing, share functional characteristics with these modalities and may influence pain perception via neurophysiological mechanisms[9,10]. Although direct measures of autonomic function were not obtained in this case, improvements in menstrual distress and systemic symptoms were interpreted within a framework of autonomic modulation.

Case Description and Management

A 22-year-old female college student presented with a two-year history of primary dysmenorrhea characterized

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by cyclic lower abdominal pain beginning on the first day of menstruation and lasting approximately 1–2 days. Her menstrual cycles were regular, with a cycle length of 28–30 days and a menstrual flow duration of 4–5 days. The pain was associated with fatigue, reduced concentration, and difficulty performing routine academic activities.

The participant reported a predominantly sedentary lifestyle, with no regular engagement in structured physical activity. She had not previously undergone formal gynecological consultation; however, there was no history suggestive of secondary dysmenorrhea, including absence of abnormal uterine bleeding, dyspareunia, intermenstrual pain, or known pelvic pathology. Clinical examination findings were unremarkable. General examination revealed stable vital signs and normal overall health status. Abdominal examination showed no tenderness, guarding, or palpable masses. Pelvic examination was not performed due to the absence of clinical indications and patient history suggestive of secondary causes. Musculoskeletal assessment revealed no abnormalities in posture, pelvic alignment, or abdominal muscle function.

The diagnosis of primary dysmenorrhea was made based on characteristic clinical history, regular menstrual cycles, and the exclusion of secondary causes through the absence of red flag symptoms and normal clinical findings. Baseline assessment included the WaLIDD score for dysmenorrhea severity, the Menstrual Distress Questionnaire (MDQ), and the Visual Analogue Scale (VAS) for pain intensity. Baseline scores indicated moderate dysmenorrhea severity and significant menstrual distress. Changes in autonomic-related symptoms were inferred through validated menstrual distress domains rather than direct physiological measures.

A structured meridian exercise program was implemented over 12 weeks, encompassing three consecutive menstrual cycles. Supervised sessions were conducted three times per week, lasting 15–20 minutes, and included gentle stretching, controlled movements, and coordinated breathing aimed at promoting relaxation and reducing pelvic and lower abdominal muscle tension. No pharmacological treatment or lifestyle modification was introduced during the intervention period. Post-intervention assessment demonstrated improvement across all outcome measures. The WaLIDD score decreased from 7 to 4, VAS pain intensity reduced from 8 to 4, and MDQ scores showed reductions across premenstrual, menstrual, and post-menstrual (remainder) phases. The intervention was well tolerated, and no adverse events were reported.

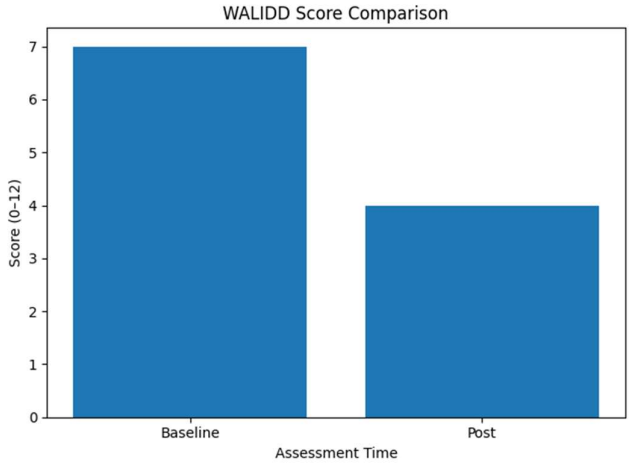

Figure 1: Changes in WaLIDD scores before and after the meridian exercise intervention.

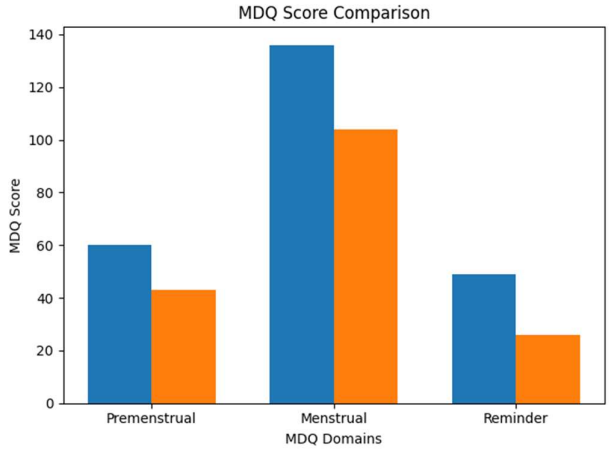

Figure 2: Changes in MDQ scores before and after the meridian exercise intervention.

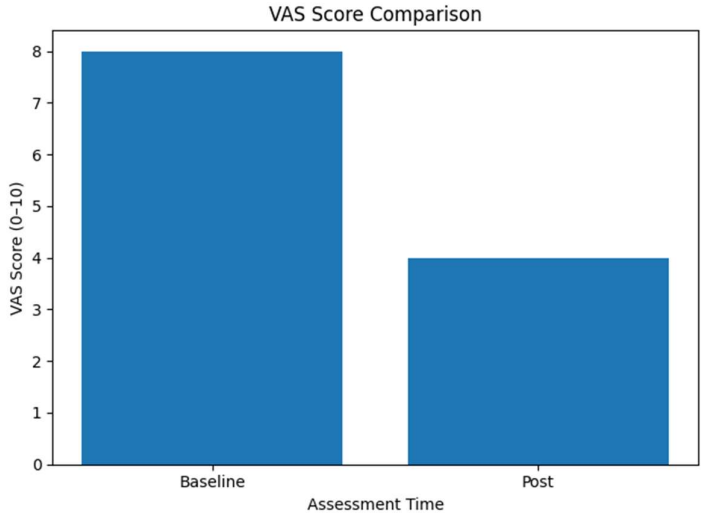

Figure 3: Changes in VAS scores before and after the meridian exercise intervention.

Outcome Measure	Baseline	Post-intervention
WaLIDD Score	7	4
VAS (0–10)	8	4
MDQ Score	Pre-Menstrual – 60 Menstrual – 136 Remainder – 49	Pre-Menstrual – 43 Menstrual – 104 Remainder – 26

Table 1: Outcome Measures Pre- and Post-Intervention

The meridian exercise program was conducted for 12 weeks, with supervised sessions performed three times per week. Each session lasted approximately 15–20 minutes and consisted of three components:

1. Warm-up (5 minutes):

- Gentle full-body mobility exercises (neck rotations, shoulder rolls, trunk rotations)
- 8–10 repetitions per movement

2. Meridian-based Exercise Sequence (10–12 minutes):

- Controlled stretching and rhythmic movements targeting the trunk, pelvis, and lower limbs
- Exercises included forward bending, lateral trunk stretching, pelvic tilting, and lower limb mobilization
- Each movement was performed for 8–12 repetitions, with 2 sets per exercise
- Movements were performed slowly and synchronized with breathing

3. Breathing and Relaxation (3–5 minutes):

- Diaphragmatic breathing in a relaxed supine or sitting position

- Inhalation for 4 seconds, exhalation for 6 seconds
- 8–10 breathing cycles per session

Rest intervals of 30–60 seconds were provided between sets as needed. Exercise intensity was maintained at a low-to-moderate level and progressed gradually based on participant tolerance. The participant was instructed to avoid pain-provoking movements and maintain consistency throughout the intervention period.

Time Point	Phase	Assessment/Intervention Details
Week 0	Baseline	WaLIDD, VAS, MDQ assessment before intervention
Weeks 1–4	Menstrual Cycle 1	Meridian exercise (3 sessions/week); symptom monitoring during menstrual phase
Week 4	Cycle 1 Follow-up	VAS and symptom review
Weeks 5–8	Menstrual Cycle 2	Continued meridian exercise; progression of movement and breathing control
Week 8	Cycle 2 Follow-up	VAS, MDQ reassessment
Weeks 9–12	Menstrual Cycle 3	Continued intervention with maintained intensity
Week 12	Post-intervention	Final assessment: WaLIDD, VAS, MDQ

Table 2: Intervention Timeline Across Menstrual Cycles

Participant Perspective

The participant reported a positive experience with the meridian exercise program. She found the exercises easy to perform, time-efficient, and feasible to incorporate into her daily routine. Over the course of the intervention, she perceived a noticeable reduction in pain intensity and improvement in her ability to carry out academic and daily activities during menstruation. She also reported feeling more relaxed and better able to manage menstrual discomfort without the need for medication.

Informed Consent

Written informed consent was obtained from the participant for participation in this study and for the publication of this case report, including anonymized data. The participant was assured of confidentiality, and all identifying information has been omitted to protect privacy.

Discussion

This case report demonstrates clinically meaningful improvement in menstrual pain severity and associated symptoms following a meridian exercise intervention. The reduction in WaLIDD score reflects improvement in pain intensity, duration, and associated symptoms and aligns with existing evidence supporting exercise-based management of primary dysmenorrhea[6,7].

The reduction in VAS scores represents a clinically relevant decrease in subjective pain intensity, comparable to outcomes reported in studies examining aerobic exercise, stretching, and integrative movement-based interventions[7,8]. Improvements in MDQ scores suggest broader symptom modulation beyond pain relief, including emotional and functional aspects of menstrual distress[2].

These findings may be interpreted through contemporary pain science frameworks that recognize dysmenorrhea as involving central pain processing and autonomic imbalance in addition to peripheral uterine mechanisms[4,5]. Movement-based interventions incorporating controlled breathing and relaxation may influence autonomic regulation, reduce sympathetic dominance, and improve pain tolerance[9]. Autonomic modulation in this case is inferred from improvements in pain intensity and systemic menstrual symptoms rather than direct autonomic measurements.

Non-pharmacological strategies are particularly relevant given the limitations associated with long-term NSAID use[3]. Meridian exercise appears to be a feasible, safe, and acceptable option for young women with primary dysmenorrhea. However, as a single-case report, findings cannot be generalized. Future studies incorporating larger samples and objective autonomic measures such as heart rate variability are recommended.

Learning Points

- Primary dysmenorrhea involves central pain processing and autonomic dysregulation.
- Meridian-based exercise may reduce menstrual pain without pharmacological treatment.
- Stating inferred mechanisms improves interpretation in case reports.

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