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Effect Of Muscle Energy Technique on Pain and Functional Disability in Females with Coccydynia Following Child Birth

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Abstract

Background: Coccydynia, first described by James Young Simpson in 1859, is pain in the coccygeal region commonly associated with trauma, prolonged sitting, and childbirth. It accounts for approximately 1–3% of low back pain cases and is more common in postpartum females due to delivery-related trauma. The pain is aggravated during sitting and sit-to-stand activities, affecting daily function and quality of life.

Objective: To compare the effects of Muscle Energy Technique (MET) combined with conventional physiotherapy versus conventional physiotherapy alone in postpartum females with Coccydynia.

Methods: Thirty postpartum females aged 25–35 years with Coccydynia were randomly divided into two groups. Group A received MET with conventional physiotherapy, while Group B received only conventional physiotherapy. Treatment was provided for 30–40 minutes, three times weekly for six weeks. Outcome measures included the Visual Analogue Scale (VAS) and Modified Oswestry Disability Index (MODI), assessed at baseline, 3 weeks, and 6 weeks.

Results: Both groups showed significant improvement in pain and functional disability. However, Group A demonstrated significantly greater improvement in VAS and MODI scores compared to Group B ($p < 0.001$).

Conclusion: Both interventions were effective in managing postpartum Coccydynia, but the addition of MET produced superior results in reducing pain and improving function.

Keywords: Coccydynia, Muscle Energy Technique, Physiotherapy, Postpartum, Short Wave Diathermy, Phonophoresis.

1. Introduction

Coccydynia, first termed by James Young Simpson in 1859, has been recognized for centuries and continues to present diagnostic challenges due to its multifactorial causes and difficulty in identifying the exact source of pain. Variability in treatment approaches and outcomes further complicates its management.[1] Coccydynia is a painful condition affecting the coccyx (tailbone), often caused by trauma, prolonged sitting, or childbirth.It can significantly interfere with daily activities and quality of life due to persistent discomfort in the tailbone region.[2]

Coccydynia accounts for 1–3% of low back pain cases and is more common in women, especially during pregnancy and the postpartum period due to biomechanical and hormonal changes [3] The coccyx normally moves 5°–25° during sitting. Reduced movement (<5°) or excessive movement (>25°) may contribute to Coccydynia. [4] Postpartum Coccydynia commonly occurs due to childbirth-related stress on the sacrococcygeal region. Factors such as trauma, pelvic floor dysfunction, coccygeal mobility changes, muscle tightness, biomechanical imbalance, and obesity contribute to coccygeal pain.[5] Coccydynia commonly worsens during sitting due to increased coccygeal pressure, leading to compensatory postural changes. Pregnancy-related ligament laxity, vaginal or instrumental delivery, and poor postpartum ergonomics further increase stress on the coccyx and risk of injury. [6]

Maigne et al. (2012) described postpartum coccydynia as pain occurring immediately after sitting post-delivery or within two weeks, with an incidence of 4–15%, though often underreported. [7] Coccydynia is characterized by localized coccygeal pain and tenderness, commonly seen in postpartum females. Pain typically increases with prolonged sitting, standing, rising from sitting, and sometimes during intercourse or defecation.[8] Pain in Coccydynia may vary with the sitting surface and is often aggravated during sit-to-stand movements due to coccygeal instability or hypermobility.[9] Examination of Coccydynia includes inspection and palpation of the sacrococcygeal region to identify tenderness, swelling, instability, or abnormalities. Pelvic floor muscle function and coccygeal mobility are also assessed, while findings such as sharp pain, lumps, or irregular contours may indicate inflammation or structural pathology.[10] The Coccygeal Movement Test evaluates coccygeal movement during pelvic floor muscle contraction in sitting. Ventral movement indicates normal contraction, while absent or outward movement suggests poor pelvic floor activation or straining.[11]

Management of Coccydynia includes pain-relieving modalities such as ice, heat, ultrasound, and medications like NSAIDs and acetaminophen. Supportive measures, including U-shaped cushions and manual therapy, may help reduce symptoms, while injections are used in persistent cases. Surgery (coccygectomy) is reserved for refractory cases.[12] Most cases of Coccydynia improve with conservative management, though chronic cases may occasionally require coccygectomy. Physiotherapy plays an important role through techniques such as Muscle Energy Technique, massage, cryotherapy, heat therapy, ultrasound, short wave diathermy, and myofascial release to reduce pain and improve function.[13] Postpartum Coccydynia can significantly affect pain and functional ability, making effective physiotherapy management essential. This study evaluates the effectiveness of Muscle Energy Technique combined with conventional physiotherapy to support evidence-based rehabilitation and improve outcomes.

Materials and Methods

Participants and Study Design - This randomized controlled trial was conducted at the OPD of the University College of Physiotherapy, Faridkot, over 6 months (September 2025–March 2026) to evaluate the effect of Muscle Energy Technique (MET) on pain and functional disability in postpartum Coccydynia. Thirty postpartum women aged 25–35 years with clinically diagnosed coccydynia were recruited through consecutive sampling and randomly allocated into two groups (n=15 each) using a computer-generated randomization method with sealed opaque envelopes.Pain and functional disability were assessed using the Visual Analogue Scale (VAS) and Modified Oswestry Disability Index (MODI) at baseline, 3 weeks, and 6 weeks. Inclusion criteria included postpartum females with localized coccygeal pain (VAS ≥6), while patients with trauma, fractures, neurological disorders, pregnancy, previous surgeries, or other musculoskeletal conditions were excluded. All participants provided written informed consent, and all 30 completed the study without dropout

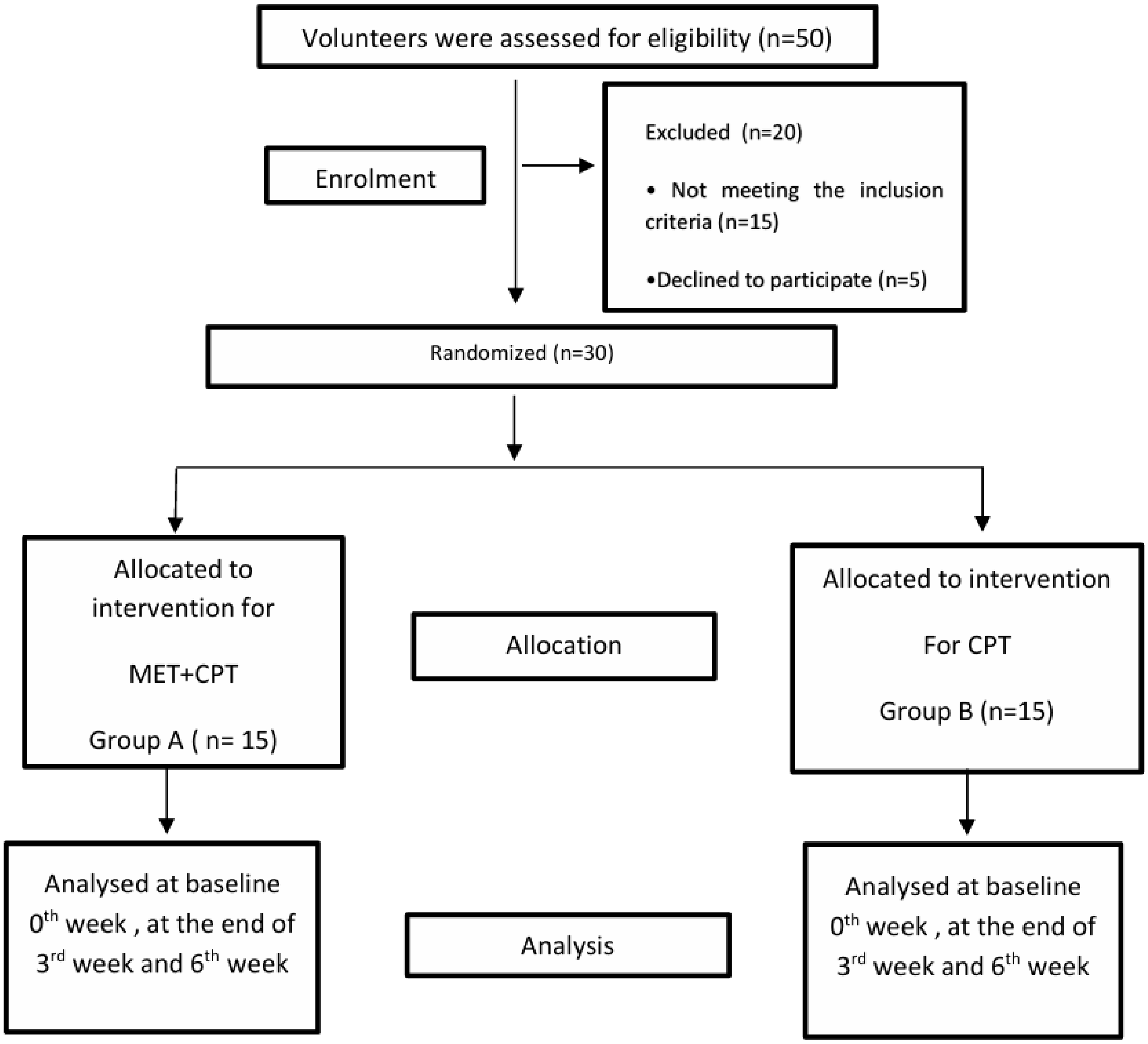

Figure – Consort Flow Diagram

Assessment tools

Visual Analogue Scale (VAS): A simple and reliable tool used to measure pain intensity, consisting of a 10 cm line ranging from "no pain" (0) to "worst pain imaginable" (10). Patients mark their pain level on the line, and the measured distance represents the pain score.It is quick, subjective, and highly reliable (0.95–0.98), making it widely used for clinical pain assessment. [14]

Modified Oswestry Disability Index (MODI): Aself-administered questionnaire consisting of ten items evaluating the impact of pain on daily activities such as personal care, lifting, walking, sitting, standing, sleeping, social life, travelling, and employment. Each item is scored from 0 to 5, with higher scores indicating greater disability. The total score is calculated as a percentage of the maximum possible score (50), with disability levels categorized as minimal (0–20%), moderate (20–40%), severe (40–60%), crippled (60–80%), and bed-bound (80–100%). MODI is a highly reliable (r = 0.94–0.99) and valid tool for assessing functional disability. [15]

Interventional Methods - In this study , Group A was the Experimental Group , Patients in this Group received MET technique and conventional physiotherapy and Group B constitued Control Group in which conventional therapy was given to all the patients. Both the groups received treatment of 30-40 minutes for 6 weeks with 3 sessions per week(18 sessions). The patients in both the group were advised for home exercises and precautions daily.

Muscle Energy Technique

MET for piriformis-The patient was positioned supine with the treated leg flexed at the hip and knee. The foot rested on the table lateral to the opposite knee (figure-four position). Hip flexion did not exceed 60°.The therapist stood beside the treated leg. One hand stabilized the contralateral ASIS, while the other hand was placed on the lateral aspect of the flexed knee to provide resistance.The patient performed an isometric contraction by pushing the knee outward (abduction) against resistance for 5–10 seconds. After relaxation, the therapist gently moved the treated leg into adduction until the resistance barrier was felt and maintained the stretch. A brief rest interval was allowed before repeating the maneuver. [16] Isometric contraction is maintained for 5–10 seconds , followed by stretch hold of 10–30 seonds with 5–10 s rest between repetitions, repeated 5 times [17].

MET for Iliopsoas Muscle- The patient was positioned prone. A pillow was placed under the abdomen or the opposite foot rested on the floor to help stabilize the pelvis.The therapist stood beside the treated limb. One hand supported the patient’s thigh, while the other hand stabilized the pelvis by applying pressure over the sacrum or ischial tuberosity.The therapist gently lifted the thigh to assess hip extension and identified the restrictive barrier (normally about 10° of extension). The patient then performed an isometric contraction of the thigh against resistance using approximately 15–25% effort for 7–10 seconds. After relaxation, the therapist moved the thigh further into extension up to the new resistance barrier and maintained the stretch, ensuring pelvic stability and avoiding lumbar hyperextension. The sequence was repeated following brief rest intervals.[16] Isometric contraction is maintained for 5–10 seconds , followed by stretch hold of 10–30 seonds with 5–10 s rest between repetitions, repeated 5 times [17]

Conventional physiotherapy

Phonophoresis -Ultrasound waves were applied with sodium diclofenac (Voltaren Emulgel, Novartis) phonophoresis therapy through ultrasound device in continuous mode to allow penetration over the coccyx while the patient assuming a prone position. The parameters of ultrasound were1 MHz frequency for deep penetration,1.5 W/cm^2 power for 5 minutes in a session. [9]

Short Wave Diathermy - Short Wave Diathermy was applied in prone lying with pelvic support under the abdomen for comfort and alignment. Continuous mode SWD was delivered over the lumbosacral and coccygeal region for 20 minutes, three times weekly for 6 weeks, to reduce pain and muscle spasm, improve circulation, and promote tissue healing. [18]

Static stretching

For Piriformis: The participant was positioned in supine lying with the affected leg placed in a figure-four position. The therapist passively stretched the piriformis muscle by pushing the opposite thigh toward the chest. The stretch was held for 20–30 seconds and repeated 5–7 times to reduce muscle tightness, improve flexibility, and relieve pain in postpartum Coccydynia. [5]

For Iliopsoas: The participant was positioned in supine lying near the edge of the bed while the therapist stabilized one knee toward the chest and passively stretched the opposite leg downward to stretch the iliopsoas muscle. The stretch was held for 20–30 seconds and repeated 5–7 times to improve flexibility, reduce muscle tightness, and decrease lumbopelvic stress. [5]

Group B - Group B received conventional physiotherapy alone same as Group B

Home Exercises Programme -Patients were advised to avoid prolonged sitting, standing and supine lying and were educated to frequently change their posture and use air-filled cushions to avoid extra pressure on the coccyx and patient were instructed to do exercises such as pelvic floor exercises, bridging, clamshell and hamstring stretching with 10 repetition each .They were encouraged during every visit to perform home exercise daily. [4]

Statistical analysis - The collected data were analyzed using descriptive statistics (mean ± standard deviation). Normality was assessed using the Shapiro–Wilk and Kolmogorov–Smirnov tests, confirming that outcome measures at baseline, 3rd week, and 6th week were normally distributed ($p > 0.05$). Within-group differences for Group A and Group B were evaluated using paired t-tests, while between-group comparisons were performed using unpaired t-tests. The level of statistical significance was set at $p < 0.05$. Paired t-test was used to analyse pain and functional disability with in groups and unpaired t-test to compare between the groups.

Results

Changes in the level of Pain and Functional Disability

Table : Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of VAS between Group A and Group B.

Unpaired 't' test	**Comparison**					
	Visual Analogue scale					
	0th day		**3rd week**		**6th week**	
	Group-A	**Group-B**	**Group-A**	**Group-B**	**Group-A**	**Group-B**
Mean	7.60	7.60	5.20	6.33	2.667	4.80
S.D.	0.985	0.985	1.424	1.234	1.234	1.082
N	15	15	15	15	15	15
M.D.	0.00		1.333		2.133	
df	28		28		28	
Unpaired ‘t’ test	.00		2.329		5.033	
Tab.value at 0.05	2.05		2.05		2.05	
P value	1.00		<0.001*		<0.001*	
Result	**Non-Significant**		**Significant**		**Significant**	

The unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of VAS between Group A and Group B. The result shows no significant difference at baseline (0th day) with a mean difference of 0.00 and t = 1.0. At the 3rd week, a significant difference was observed (mean difference = 1.333; t = 2.329), which further increased by the 6th week (mean difference = 2.133; t = 5.033), indicating progressive improvement between the groups.

Table: Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of MODI between Group A and Group B.

Unpaired 't' test	Comparison					
	Modified Oswestry Disability Index					
	0th day		3rd week		6th week	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Mean	72.267	71.667	55.067	67.20	38.133	61.467
S.D.	6.562	4.775	7.676	4.345	3.795	4.764
N	15	15	15	15	15	15
M.D.	0.60		12.133		23.333	
df	28		28		28	
Unpaired ‘t’ test	0.286		5.327		14.836	
Tab. value at 0.05	2.05		2.05		2.05	
P value	0.777		<0.001*		<0.001*	
Result	**Non-Significant**		**Significant**		**Significant**	

The unpaired t-test for MODI scores showed no significant difference at baseline (mean difference = 0.60; t = 0.286). However, significant differences were observed at the 3rd week (mean difference = 12.133; t = 5.327) and 6th week (mean difference = 23.333; t = 14.836), indicating substantial improvement between the groups over time.

Discussion

The present study was conducted on 30 patients who were randomly divided into two groups, with 15 patients in each group. Group A received Muscle Energy Technique (MET) along with conventional physiotherapy, including stretching, phonophoresis, and short wave diathermy, while Group B received only conventional physiotherapy. All participants were assessed at baseline (0th day), 3rd week, and at the end of the 6th week using outcome measures such as VAS and MODI. Within-group analysis showed that both Group A and Group B experienced statistically significant improvements in pain and functional disability over time. However, when comparing between the groups, Group A demonstrated significantly greater improvement than Group B at the end of the 6th week. This indicates that the addition of MET to conventional physiotherapy provides superior outcomes in reducing pain and improving functional ability in postpartum coccydynia.The findings of this study are supported by previous research. Studies by Arun B et al. (2025)[13] and Heba Embaby et al. (2017)[19] reported that MET, especially when combined with other modalities like ultrasound or phonophoresis, is more effective in reducing pain and improving function compared to conventional techniques alone. Similarly, Wajeeha Zia et al. (2023) [7] found that MET targeting muscles such as piriformis and iliopsoas was more effective than static stretching in improving pain and sitting tolerance. Tehreem Ansari et al. (2020)38 [20] also demonstrated that combining MET with phonophoresis yielded better outcomes than phonophoresis alone. Additional support comes from studies by Mayuri Chandra (2025) [21] and Sanakr Ganesh A et al. (2019) [22] which highlight the effectiveness of physiotherapy interventions, including MET and short wave diathermy, in managing coccydynia.However, some studies, such as those by Mohammad et al. (2025)[23] and.The greater improvement observed in the MET group in this study may be explained by its physiological effects. MET helps in reducing muscle tightness, improving flexibility, correcting biomechanical imbalances, and restoring normal joint mobility. In postpartum coccydynia, where pain is often associated with pelvic floor dysfunction, soft tissue strain, and altered coccygeal mechanics, MET may help normalize these factors. When combined with conventional physiotherapy, which aids in pain relief, tissue healing, and strengthening, the overall effect results in better functional recovery, reduced pain, and improved quality of life.

Conclusion

The present study demonstrates that physiotherapy interventions are effective in reducing pain and improving functional outcomes in postpartum females with coccydynia. Both treatment approaches—MET combined with conventional physiotherapy and conventional physiotherapy alone—resulted in significant improvements in pain intensity, functional disability, and quality of life over a six-week period.However, the group receiving MET along with stretching, phonophoresis, and short wave diathermy showed greater improvement in VAS and MODI scores compared to the conventional physiotherapy group. These improvements were statistically highly significant ($p < 0.001$) at baseline, 3rd week, and 6th week.Overall, the study concludes that integrating MET with conventional physiotherapy is more effective than conventional physiotherapy alone in reducing pain and improving functional ability in postpartum females with coccydynia.

LIMITATIONS OF THE STUDY

The present study had several limitations. The sample size was small, and the duration of the study was limited, which may have affected the generalizability of the findings. Additionally, the study was restricted to a small geographical area of Faridkot, limiting the broader applicability of the results. No long-term follow-up was conducted to assess the sustained effects of the interventions. Furthermore, the study did not differentiate between primigravida and multigravida participants, which could have influenced pain severity, functional disability, and treatment outcomes.

FUTURE SCOPE

Future studies should include long-term follow-up to evaluate the sustained effects of treatment and the recurrence of symptoms over time. Participants above 35 years of age may also be included in future research to broaden the study population and improve the generalizability of the findings. Furthermore, future studies should compare outcomes between primigravida and multigravida women to better understand the influence of parity on pain severity, functional disability, and treatment response.

Ethical Approval and Consent:
The Institutional Ethical consideration was strictly used in the study. Prior to commencement of the study an approval was taken from the Institutional Ethical Committee, UCOP, Baba Farid University of Health and Sciences, Faridkot (No.BFUHS/2K25p-TH/22496).

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