



Compare the Effects of Muscle Energy Technique with Core Stability Exercise and Proprioceptive Neuromuscular Facilitation Technique on Pain and Functional Limitation in Patients with Sacroiliac Joint Dysfunction Syndrome

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Abstract

Background: Sacroiliac joint dysfunction syndrome (SIJDS) is a common but often underdiagnosed cause of low back pain, leading to significant pain and functional limitation. Various physiotherapeutic interventions, including Muscle Energy Technique (MET), Proprioceptive Neuromuscular Facilitation (PNF), and core stability exercises, are commonly used in clinical practice.

Objective: To compare the effects of Muscle Energy Technique with core stability exercise and Proprioceptive Neuromuscular Facilitation technique on reducing pain and functional limitation in patients with sacroiliac joint dysfunction syndrome.

Methods: A comparative experimental study was conducted on 20 patients diagnosed with sacroiliac joint dysfunction syndrome. Participants were selected using convenient sampling and randomly allocated into two groups. Group A (n = 10) received muscle energy technique with core stability exercises, while group B (n = 10) received proprioceptive neuromuscular facilitation with core stability exercises. Interventions were administered for 40 minutes per session, four days per week for six weeks. Pain intensity was assessed using the visual analogue scale (VAS) and functional limitation was measured using the modified Oswestry disability index (MODI). Paired and unpaired t-tests were used for statistical analysis.

Results: Both groups showed statistically significant improvements in pain and functional limitation ($p < 0.05$). Group A demonstrated a greater reduction in VAS scores (pre-test mean: 8.0 ± 0.82 ; post-test mean: 6.20 ± 1.03) compared to group B (pre-test mean: 8.20 ± 0.79 ; post-test mean: 7.60 ± 0.70). Similarly, MODI scores showed greater improvement in Group A (pre-test mean: 49.10 ± 2.60 ; post-test mean: 38.10 ± 4.43) than Group B (pre-test mean: 47.70 ± 1.89 ; post-test mean: 45.90 ± 2.42). Unpaired t-test analysis revealed a statistically significant difference between groups in post-test scores for both VAS and MODI ($p < 0.05$).

Conclusion: Muscle Energy Technique combined with core stability exercises is more effective than Proprioceptive Neuromuscular Facilitation combined with core stability exercises on reducing pain and functional limitation in patients with sacroiliac joint dysfunction syndrome.

Keywords: Sacroiliac Joint Dysfunction; Muscle Energy Technique; Proprioceptive Neuromuscular Facilitation; Core Stability Exercises; Visual Analogue Scale; Oswestry Disability Index

Introduction

Sacroiliac joint dysfunction syndrome defined as pain and abnormal movement in the sacroiliac joint, which connects the sacrum at the base of the spine to the iliac bones of the pelvis. These joints play an important role in transferring weight and forces between the upper body and lower limbs during standing, walking and other movements. Dysfunction may occur due to either hypomobility or hypermobility of the joint, resulting in pain in the lower back, buttock or thigh region [3].

Sacroiliac joint dysfunction is pain in the lower back caused by alteration in the normal joint motion to hypermobility or hypomobility. Sacroiliac joint dysfunction has been found to be the primary cause of lower back pain in 15 to 40 percentage of patients. Pain in the sacroiliac joint region can additionally cause groin and thigh region pain. Tenderness in the sacroiliac joint upon palpation is a reliable sign that the sacroiliac joint is the source of pain. Sacroiliac joint functionality is affected by different pathological changes, the commonest of which seem to be related to biomechanical inefficiencies [5].

The prevalence of sacroiliac joint dysfunction is approximately 25 percentage in adult patients with chronic low back pain. Pain can be unilateral or bilateral but usually not midline. Women are more commonly affect sacroiliac joint dysfunction than men. The prevalence of sacroiliac joint dysfunction has been reported to increase to 32 percentage to 37 percentage in lumbosacral fusion patients. The pain is often mechanical and may be aggravated by activities such as prolonged standing, stair climbing or sitting. 88 percentage of cases of sacroiliac joint injury are due to either repetitive microtrauma or acute trauma. There is a high prevalence of sacroiliac joint injury in athletes. 20 percentage cases are pregnancy related. 4 percentage are idiopathic. The majority of individuals affected by sacroiliac joint pain are in adults. obese patients are more commonly affected by sacroiliac joint pain. The disorder is seen in both genders and people of all races [4].

There are several treatment options for curing or relieving pain, conservative treatment including injection of local anaesthesia, physical therapy, pelvic belts and surgical treatment of joint fixation using metal implants. Since the cause has been hypothesized to be joint misalignment, fixation of the Sacroiliac joint to prevent excessive motion is considered as an effective therapy to relieve Sacroiliac joint pain.

Muscle energy techniques are a form of soft tissue or joint manipulations, derived from osteopathic medicine and employed in the treatment of musculoskeletal dysfunction. Muscle energy technique has osteopathic roots and emerged as a form of osteopathic treatment in which the patient is specifically positioned and then muscles are actively contracted on request in a specific direction against a counterforce. The technique involves patients muscle contraction against a practitioner's counterforce [1,2,6,7].

Proprioceptive neuromuscular facilitation is a therapeutic approach designed to improve performance of functional tasks by increasing strength, flexibility and range of motion. Integration of these gains assists the patient to establish head and trunk control, initiate and sustain movement, control shifts in the centre of gravity and control the pelvis and trunk in the midline while the extremities move. Using the developmental sequences as a guide, the goal of these techniques is to promote achievement of progressively higher levels of proficiency and functional independence in bed mobility, transitional movements, sitting, standing and walking [9,10].

Core stability exercises are exercises designed to train the muscles of the trunk and hip to control the position and movement of the lumbopelvic region in order to maintain a stable spine. The capacity to maintain the equilibrium of the vertebral column within its physiologic limits by reducing displacement from perturbations and maintaining structural integrity [8].

Materials and Methods

Study design and setting

This was a pre-post Comparative experimental study conducted at Sree Abirami college of physiotherapy, Coimbatore, Tamil Nadu, over a period of 6 weeks.

Sample size and sampling method

Twenty patients diagnosed with sacroiliac joint dysfunction syndrome were selected using convenient sampling and divided into two groups (n = 10 each).

Inclusion criteria:

- Age between 20 and 60 years.
- Both male and female participant.
- Subjects with unilateral or bilateral sacroiliac joint pain.
- Subjects experiencing low back pain localized around the sacroiliac region.

- Pain intensity between mild to moderate on Visual analogue scale.
- Functional disability score between 30 to 50% (moderate) on modified Oswestry disability index.

Exclusion criteria:

- Pregnancy
- Metallic implants
- Fractures
- Inflammatory joint diseases
- Infection
- Radiculopathy
- Neoplastic conditions
- Intervention protocol.

Group allocation

Participants were divided into two equal groups (n = 10 each).

- **Group A:** Muscle energy technique + core stability exercise.
- **Group B:** Proprioceptive neuromuscular facilitation techniques + core stability exercise.

Intervention protocol

- Duration: 6 weeks.
- Frequency: 4 sessions/week.
- Session Duration: 30 minutes.

Group A: Muscle energy technique with core stability exercise

Target muscles: Iliopsoas, hamstrings, piriformis and quadratus lumborum muscles

- Technique: Hold-relax.
- Therapist-guided resisted muscle contractions followed by stretching.
- Combined with core strengthening.

Group B: Proprioceptive Neuromuscular Facilitation techniques with core stability exercise

Target muscles: Iliopsoas, hamstrings, rectus femoris, gluteus medius muscle



Figure A

- Technique: Contract-relax.
- Therapist-guided resisted muscle contractions followed by stretching.
- Combined with core strengthening.



Figure B

Outcome measures

Pain intensity was assessed using the visual analogue scale (VAS), a reliable and valid tool for subjective pain measurement. Functional limitation was evaluated using the modified Oswestry disability index (MODI), which is widely used to assess disability related to low back pain.

All outcomes were assessed at baseline and post-intervention (week 6):

Statistical analysis

Paired t-test was used to analyse within-group differences, and unpaired t-test was used to compare between-group differences. The level of significance was set at $p < 0.05$.

Outcome	Tool	Description
Pain	Visual analogue scale (VAS)	0 = no pain, 10 = worst pain
Disability	Oswestry disability index (MODI)	Assesses limitations in daily living due to pain

Table 1

Results

Within-group comparisons

Both groups showed statistically significant improvements from pre- to post-intervention in pain (VAS) and functional limitation (MODI) (p < 0.0001).

Outcome measure	Group	Pre (Mean ± SD)	Post (Mean ± SD)
VAS (Pain)	MET	8.0 ± 0.82	6.2 ± 1.02
	PNF	8.2 ± 0.79	7.6 ± 0.70
MODI (DIS-ABILITY)	MET	49.1 ± 2.60	38.1 ± 4.43
	PNF	47.7 ± 1.89	45.9 ± 2.42

Table 2

Between-group post-intervention comparisons

Between-group analysis revealed that the MET group showed significantly better improvement in mobility and function compared to the PNF group.

- **VAS:** significant difference between groups
- **MODI:** Group A improved more than group B.

Outcome	MET+CSE (Mean ± SD)	PNF+CSE (Mean ± SD)
VAS (pain)	6.2 ± 1.03	7.6 ± 0.70
MODI (disability)	38.1 ± 4.43	45.9 ± 2.42

Table 3

Graph 1: VAS (Pain) - MET+CSE vs PNF+CSE

Graph 2: MODI (Disability) - MET+CSE vs PNF+CSE

Limitations of the Study:

- Small sample size.
- Limited age range (20 - 60 years).
- Short-term follow-up.

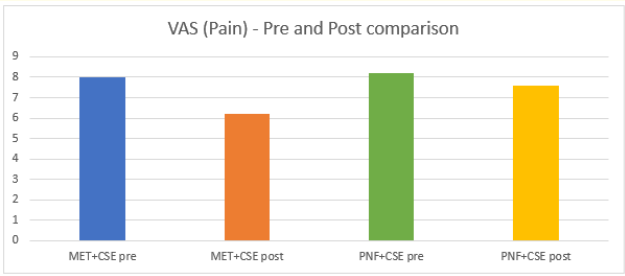


Figure 1: Comparison of visual analog scale (VAS) scores pre- and post-intervention in both MET+CSE and PNF+CSE groups. Both groups showed significant pain reduction (p < 0.0001), with statistically significant difference between the two post-treatments (p=).

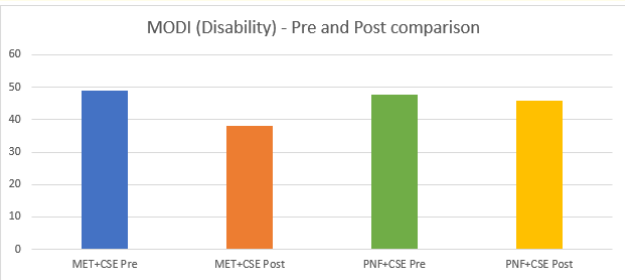


Figure 2: MODI scores before and after treatment in MET+CSE and PNF+CSE groups. The MET+CSE group showed significantly greater improvement in disability compared to the PNF+CSE group (p =).

Recommendations

- Future studies with larger sample sizes.
- Inclusion of long-term follow-up.
- Comparison with other manual therapy techniques.

Discussion

The purpose of the study was to compare the effects of muscle energy technique with core stability exercise and proprioceptive

neuromuscular facilitation technique on pain and functional limitation in patients with sacroiliac joint dysfunction syndrome.

20 patients with sacroiliac joint dysfunction syndrome who fulfilled the pre-determined inclusion and exclusion criteria were selected and divided into two groups. Group A underwent muscle energy technique with core stability exercise and Group B underwent proprioceptive neuromuscular facilitation with core stability exercise.

Statistical analysis using unpaired 't' test showed that there was a significant difference between the effectiveness of muscle energy technique with core stability exercise and proprioceptive neuromuscular facilitation with core stability exercise in sacroiliac joint dysfunction syndrome.

To compare the pre-test values of Group A and Group B, an unpaired 't' test was conducted. The result demonstrated no significant difference in pain between two groups with a calculated 't' value of 0.5554, which was lesser than the table 't' value of 2.101. also, post-test values of Group A and Group B, an unpaired 't' test was conducted. The result demonstrated significant difference in pain between two groups, with a mean difference of 6.2 and 7.6 respectively.

To compare the pre-test values of Group A and Group B, an unpaired 't' test was conducted. The result demonstrated no significant difference in functional limitation between two groups, with a calculated 't' value of 1.3773 which was lesser than the table 't' value of 2.101. Also, the post-test values of Group A and Group B, an unpaired 't' test was conducted.

The result demonstrated a significant difference in functional limitation between two groups, with a calculated 't' value of 4.8863, which exceeded the table 't' value of 2.101.

Conclusion

The aim of the study was to compare the effects of muscle energy technique with core stability exercise and proprioceptive neuromuscular facilitation technique in sacroiliac joint dysfunction syndrome.

20 patients with sacroiliac joint dysfunction syndrome who fulfilled the inclusive and exclusive criteria were selected and

divided into two groups, 10 in each group. Group A underwent muscle energy technique with core stability exercise and Group B underwent proprioceptive neuromuscular facilitation with core stability exercise. Pain was measured by using visual analogue scale and functional limitation was measured by modified Oswestry disability index. Treatment duration was 6 weeks. The values of outcome measure were recorded before the beginning of treatment day 1 and at the end of treatment sixth week.

Statistical analysis was done by using paired and unpaired 't' test. Paired 't' test was used to find out the improvement within the group. Unpaired 't' test was used to find out the difference between two groups.

The result showed that there was a significant difference between the effects of muscle energy technique with core stability exercise on pain and functional limitation in patients with sacroiliac joint dysfunction syndrome.

This study concluded that, muscle energy technique with core stability exercise is more effective than proprioceptive neuromuscular facilitation with core stability exercise on pain and functional limitation in patients with sacroiliac joint dysfunction syndrome.

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