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COMPARATIVE EFFECTIVENESS OF SACROILIAC JOINT MOBILIZATION AND HIGH-VELOCITY LOW-AMPLITUDE THRUST MANIPULATION ON PAIN REDUCTION IN FEMALE PATIENTS

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Abstract

Background: Sacroiliac joint dysfunction (SIJD) is a common cause of lower back pain, significantly impacting daily activities and quality of life. Various treatment approaches, including mobilization and high-velocity low-amplitude (HVLA) thrust manipulation, have been explored to manage SIJD.

Objective: This study aimed to compare the effectiveness of sacroiliac joint mobilization and HVLA thrust manipulation in reducing pain and functional disability in female patients with SIJD.

Methodology: A single-blinded randomized controlled trial (RCT) was conducted with 72 female participants aged 25–50 years. Participants were randomly assigned to two groups: Group 1 received sacroiliac joint mobilization, while Group 2 received HVLA thrust manipulation. Both groups underwent treatment three times per week for four weeks. Pain intensity and functional disability were assessed using the Numeric Pain Rating Scale (NPRS) and Modified Oswestry Disability Index (MODI), respectively. Statistical analysis was performed using SPSS 20.0.

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Results: Both interventions significantly reduced pain and improved functional status ($p < 0.05$). NPRS scores decreased significantly across all assessment weeks in both groups, with comparable improvements in MODI scores.
Conclusion: Both mobilization and HVLA thrust manipulation are effective in reducing pain and disability in female patients with SIJD. Further research with larger sample sizes is recommended.

Introduction

Lower back pain is a prevalent musculoskeletal condition that significantly affects individuals' quality of life and daily activities. Among its various causes, sacroiliac joint dysfunction (SIJD) has been recognized as a common contributor to chronic and acute lower back pain, particularly in female patients. SIJD is characterized by pain and functional impairment due to abnormal motion or misalignment of the sacroiliac joint, often leading to discomfort in the lower back, buttocks, and lower extremities. Given its impact on mobility and overall well-being, effective treatment strategies are essential for managing SIJD and improving patient outcomes.

Manual therapy techniques, such as sacroiliac joint mobilization and high-velocity low-amplitude (HVLA) thrust manipulation, have been widely used to alleviate pain and restore function in patients with SIJD. Sacroiliac joint mobilization involves repetitive, low-force passive movements designed to enhance joint mobility and reduce stiffness. On the other hand, HVLA thrust manipulation is a technique that delivers a quick, controlled force to the joint to correct dysfunction and improve range of motion. While both approaches have shown promise in managing SIJD, their comparative effectiveness in reducing pain and disability remains an area of interest for clinicians and researchers.

The present study aims to compare the effectiveness of sacroiliac joint mobilization and HVLA thrust manipulation in reducing pain and improving functional disability in female patients with SIJD. By conducting a single-blinded randomized controlled trial, this research seeks to provide evidence-based insights into the relative benefits of these two manual therapy interventions. The findings will contribute to the existing literature and assist healthcare professionals in selecting the most appropriate treatment approach for female patients suffering from SIJD.

Literature Review

Sacroiliac joint dysfunction (SIJD) is a well-documented source of lower back pain, with studies indicating its prevalence in up to 30% of patients presenting with non-specific low back pain (Visser et al., 2013). The sacroiliac joint plays a crucial role in load transfer between the spine and lower extremities, and its dysfunction can result in significant discomfort and mobility limitations (Cohen et al., 2018).

Various therapeutic interventions have been explored for the management of SIJD, with manual therapy techniques being widely recognized for their efficacy. Sacroiliac joint mobilization has been investigated in multiple studies, demonstrating its ability to improve joint movement and alleviate pain through the modulation of mechanoreceptors and reduction of muscle tension (Hancock et al., 2015). Additionally, it has been suggested that mobilization techniques may enhance proprioception, contributing to functional recovery in patients with SIJD (Kaur et al., 2019).

High-velocity low-amplitude (HVLA) thrust manipulation has also been extensively studied for its potential benefits in treating SIJD. This technique is known to induce rapid

neurophysiological responses, including pain modulation through spinal reflex mechanisms and increased joint mobility (Puentedura et al., 2012). Research by Degenhardt et al. (2014) supports the use of HVLA thrust manipulation, indicating significant pain reduction and functional improvement in patients with sacroiliac joint dysfunction.

Comparative studies evaluating the effectiveness of mobilization versus HVLA thrust manipulation have yielded mixed results. Some researchers have found no significant difference in outcomes between the two interventions, suggesting that both are equally effective in reducing pain and improving functional status (Cleland et al., 2006). However, other studies indicate that HVLA thrust manipulation may provide more immediate pain relief, while mobilization techniques may offer sustained benefits over time (Coulter et al., 2018).

Despite these findings, there remains a need for further research focusing on specific patient populations, particularly female patients, who may exhibit distinct biomechanical and hormonal influences affecting SIJD. This study aims to address this gap by providing a comparative analysis of sacroiliac joint mobilization and HVLA thrust manipulation in female patients, contributing to a more targeted and effective treatment approach for SIJD.

Methodology

Study Design: This research employed a single-blinded randomized controlled trial (RCT) to compare the effectiveness of sacroiliac joint mobilization and high-velocity low-amplitude (HVLA) thrust manipulation in reducing pain and functional disability in female patients with SIJD.

Study Setting and Participants: The study was conducted in a clinical setting, recruiting 72 female participants aged 25–50 years diagnosed with SIJD. The inclusion criteria comprised patients experiencing SIJD-related pain for at least four weeks, confirmed through clinical assessment. Exclusion criteria included recent surgery in the lumbopelvic region, pregnancy, sciatica, osteoporosis, or any severe underlying pathology.

Randomization and Blinding: Participants were randomly allocated into two intervention groups using computer-generated randomization. The study followed a single-blinded design, ensuring that the outcome assessors were unaware of the treatment allocation to minimize bias.

Intervention Protocol: Participants in Group 1 received sacroiliac joint mobilization, while those in Group 2 underwent HVLA thrust manipulation. Both groups received treatment three times per week for four weeks. Additionally, routine physical therapy interventions, including electrotherapeutic modalities and pelvic stabilization exercises, were incorporated.

Outcome Measures: Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS), while functional disability was evaluated through the Modified Oswestry Disability Index (MODI). Baseline assessments were conducted before intervention, followed by weekly evaluations at the 1st, 2nd, 3rd, and 4th weeks.

Data Analysis: Statistical analysis was performed using SPSS version 20.0. Normality of data was tested using the Kolmogorov-Smirnov test. For within-group analysis, the Friedman test was applied, while between-group comparisons were analyzed using appropriate statistical methods. A p-value of <0.05 was considered statistically significant.

Ethical Considerations: Ethical approval was obtained prior to the study, and informed consent was acquired from all participants. Confidentiality of patient data was maintained

throughout the research process, and participants were assured of their right to withdraw at any stage without consequences.

Outcome Measures: Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS), while functional disability was evaluated through the Modified Oswestry Disability Index (MODI). Baseline assessments were conducted before intervention, followed by weekly evaluations at the 1st, 2nd, 3rd, and 4th weeks.

Results

Demographic Characteristics

Variable	Group 1 (Mobilization)	Group 2 (HVLA Manipulation)	p-value
Age (years)	37.19 ± 5.61	36.75 ± 4.56	0.58
Height (cm)	159.3 ± 6.2	160.1 ± 5.8	0.42
Weight (kg)	68.5 ± 10.3	67.8 ± 9.9	0.74

Pain and Functional Disability Scores

Assessment Time	Mobilization (NPRS)	HVLA Manipulation (NPRS)	p-value	Mobilization (MODI)	HVLA Manipulation (MODI)	p-value
Baseline	7.19 ± 0.66	6.75 ± 0.73	0.12	25.83 ± 3.39	24.36 ± 3.41	0.08
1st Week	6.17 ± 0.50	5.77 ± 0.72	0.10	21.36 ± 2.72	20.02 ± 2.51	0.07
2nd Week	5.08 ± 0.55	4.47 ± 0.55	0.03*	16.00 ± 2.57	14.72 ± 2.43	0.04*
4th Week	0.80 ± 0.40	0.91 ± 0.28	0.21	6.83 ± 2.21	7.02 ± 1.76	0.15

*$p < 0.05$ indicates statistical significance.

Both treatment approaches resulted in significant improvements in pain intensity and functional disability, with no substantial differences between groups at the final assessment.

The demographic characteristics indicate no significant differences between the two groups in age, height, or weight, ensuring a balanced comparison. Both mobilization and HVLA thrust manipulation showed significant improvements in pain intensity and functional disability over four weeks. The NPRS and MODI scores demonstrated progressive improvements, particularly from the second week onward, with statistically significant differences observed at this point ($p < 0.05$).

These findings align with previous studies that support both mobilization and manipulation as effective interventions for SIJD-related pain (Cohen, 2018; Visser et al., 2013). Similar research has indicated that HVLA manipulation may provide quicker pain relief, while mobilization offers sustained benefits over time (Puentedura et al., 2012). The gradual reduction in pain and disability scores suggests that both interventions contribute positively to patient outcomes, reinforcing their clinical relevance.

The absence of substantial differences at the fourth week suggests that both approaches are equally beneficial in the long term. This concurs with Cleland et al. (2006), who found no significant superiority between mobilization and HVLA manipulation in SIJD treatment. Future studies with larger sample sizes and longer follow-up periods may further elucidate the sustained effects of these interventions.

Discussion

The findings from this study indicate that both sacroiliac joint mobilization and HVLA thrust manipulation led to a significant reduction in pain intensity and functional

disability over the four-week intervention period. These results align with previous research demonstrating the effectiveness of manual therapy techniques in managing SIJD (Puentedura et al., 2012; Cohen, 2018). The reduction in NPRS and MODI scores over time suggests that both interventions provide substantial benefits for female patients with SIJD.

Although no significant differences were observed between the two groups in the final assessment, previous studies suggest that HVLA thrust manipulation may offer more immediate pain relief, whereas mobilization techniques may contribute to longer-term functional improvements (Cleland et al., 2006; Coulter et al., 2018). The present study's findings reinforce the clinical applicability of both techniques, highlighting their role in conservative management strategies for SIJD.

Conclusion

The study concludes that both sacroiliac joint mobilization and HVLA thrust manipulation are effective in reducing pain and functional disability in female patients with SIJD. While initial improvements may vary, the long-term benefits are comparable. These findings support the integration of both techniques in clinical practice, depending on patient-specific needs and practitioner expertise.

Suggestions for Future Research

- Future studies should investigate the long-term effects of these interventions beyond the four-week treatment period.
- Research should explore the combined effect of mobilization and manipulation techniques in SIJD management.
- Larger sample sizes and multi-center trials would enhance the generalizability of findings.

Limitations

- The study was limited to a four-week intervention period, which may not capture long-term outcomes.
- Only female patients were included, limiting generalizability to male patients.
- The single-blinded design may not have fully eliminated potential biases in treatment administration.

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