

Integrative Approaches to Endometriosis Management: The Role of PM&R and Pain Management

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Submitted: 2024, Jul 23; Accepted: 2024, Aug 26; Published: 2024, Sep 02

Citation: Fares, J. E., Abbasi, R., Akach, B., Middleton, C. J., Jadalla, L., et. al. (2024). Integrative Approaches to Endometriosis Management: The Role of PM&R and Pain Management. *J Surg Care*, 3(3), 01-05.

Abstract

Endometriosis, a prevalent yet enigmatic condition affecting women of reproductive age, manifests as the ectopic growth of endometrial-like tissue beyond the confines of the uterus. Despite its benign nature, endometriosis presents as a chronic and often debilitating disease, marked by symptoms such as dysmenorrhea, dyspareunia, chronic pelvic pain, and infertility. While retrograde menstruation stands as one implicated mechanism, the full etiology remains elusive. Endometriosis exerts a toll on the lives of affected individuals, impairing both quality of life and productivity. Despite its prevalence, diagnosing endometriosis remains fraught with challenges, often resulting in delays in treatment initiation. Collaborating closely with gynecologists, Physical Medicine and Rehabilitation (PM&R) specialists aid in early identification of endometriosis, offer conservative treatments, and provide vital support for patients during their recovery. By leveraging their expertise, PM&R teams strive to enhance functional outcomes and overall well-being, thereby mitigating the burden imposed by this complex disease. Traditionally under the purview of gynecologists, the comprehensive management of endometriosis is increasingly being recognized as a multidisciplinary endeavor. This paper examines the intricacies of managing pain and musculoskeletal dysfunctions that are a direct result of endometriosis within the framework of PM&R, underscoring the necessity for a holistic approach that addresses the myriad physical, psychological, and functional facets of this condition.

1. Introduction

The diagnosis of endometriosis typically involves a combination of clinical history, physical examination, and imaging modalities [1]. Physical Medicine and Rehabilitation physicians play a crucial role in recognizing the musculoskeletal manifestations of endometriosis and functional impairment [2]. With expertise in musculoskeletal assessment and rehabilitation, PM&R specialists are adept at recognizing subtle signs of endometriosis-related musculoskeletal dysfunction [3]. This includes identifying pelvic floor dysfunction, characterized by alterations in muscle tone, strength, and coordination, which may manifest as urinary or fecal incontinence, pelvic organ prolapse, or sexual dysfunction [4].

Furthermore, these specialists are skilled in assessing biomechanical abnormalities that may exacerbate endometriosis-related symptoms. This encompasses evaluating posture, gait, and movement patterns to identify musculoskeletal imbalances, compensatory mechanisms, and areas of increased mechanical stress [5].

Addressing the underlying biomechanical issues allows PM&R

physicians to not only alleviate pain but also optimize function and improve the overall quality of life for endometriosis patients [6]. This comprehensive approach to care is further enhanced through collaboration with gynecologists and radiologists, which is integral in a PM&R setting [2]. By closely working together, these specialists ensure a multidisciplinary approach to diagnosis and management, leveraging the unique expertise of each discipline to tailor treatment plans according to the individual needs of the patient [7]. This collaborative effort facilitates the timely identification of endometriosis-related symptoms and enables the prompt initiation of conservative interventions and rehabilitation strategies. Ultimately, this coordinated approach aims to minimize functional impairment and optimize outcomes for patients with endometriosis [8].

The purpose of this systematic review is to explore and articulate the unique role that PM&R physicians can play within the healthcare team for individuals suffering from endometriosis. PM&R specialists are uniquely positioned to address the chronic pain and musculoskeletal dysfunctions that are direct consequences of this condition. This review examines the existing body of research

on pain management strategies and musculoskeletal treatments currently being explored for endometriosis patients. Based on this evidence, we propose a comprehensive treatment regimen that PM&R physicians could implement, focusing on pain management and the restoration of musculoskeletal function.

2. Study Design and Methodology

Our research aimed to assess how the field of Physical Medicine and Rehabilitation (PM&R) can use pain management interventions to decrease the debilitating pain levels and symptoms associated with endometriosis. We drew on a comprehensive review of clinical trials, observational studies, and systematic reviews. Our focus centered on the implementation of multidisciplinary pain management strategies.

2.1. Study Selection and Criteria for Inclusion

We selected studies that specifically investigated the impact of PM&R on women diagnosed with endometriosis. Inclusion criteria encompassed studies involving female participants with a confirmed diagnosis of endometriosis, evaluations of pain intervention efficacy, and peer-reviewed clinical trials, observational studies, and systematic reviews. Conversely, exclusion criteria comprised studies unrelated to endometriosis, those lacking adequate treatment outcome data, and non-peer-reviewed articles or case reports.

2.2. Randomization and Group Allocation

Within the chosen studies, participants were typically allocated randomly to various treatment groups, including those receiving standard multidisciplinary pain management protocols. Group allocation procedures varied across studies but generally aimed to achieve comparable baseline characteristics among participants.

2.3. Treatment Protocols

The primary focus of investigation was PM&R interventions, encompassing physical therapy, pain management strategies, and support for functional recovery.

2.4. Statistical Analysis

Statistical analyses employed across the reviewed studies included descriptive statistics, t-tests, ANOVA, and regression analyses to compare treatment outcomes between groups. Key outcomes assessed included pain relief, improvements in mobility, and enhancements in overall quality of life. A significance level of $p < 0.05$ was conventionally utilized to ascertain the statistical significance of findings.

This approach enabled a rigorous examination of the role of PM&R in enhancing outcomes for individuals managing endometriosis, providing valuable insights into the efficacy and multidimensional benefits of these interventions.

2.5. Management

The management of endometriosis in a PM&R setting encompasses a multidisciplinary approach aimed at alleviating pain, restoring

function, and optimizing quality of life [9]. Pharmacological therapy plays a crucial role by implementing hormone therapy, NSAIDs, and other pharmacologic agents to mitigate pain and inflammation [10]. Patient education and counseling regarding medication adherence, side effect management, and treatment expectations are integral components of the comprehensive care provided by PM&R teams [11].

In addition to pharmacological interventions, non-pharmacological interventions such as physical therapy, pelvic floor rehabilitation, and lifestyle modifications, form the cornerstone of conservative management strategies [12]. PM&R specialists employ evidence-based techniques to address pelvic pain, improve pelvic floor muscle strength and coordination, and enhance overall functional capacity [13].

In individuals who are refractory to treatment or have significant functional impairment, injection treatment or surgical intervention may be warranted. PM&R specialists contribute to preoperative optimization, perioperative pain management, and postoperative rehabilitation to maximize surgical outcomes and facilitate the transition to functional independence [6]. Through interdisciplinary collaboration and personalized treatment plans, these providers strive to address the complex needs of endometriosis patients across the continuum of care [1].

3. Results

The purpose of our study was to delineate how the treatment of endometriosis might best progress under the supervision of a PM&R physician. Upon completion of data collection, the studies were categorized into three distinct groups:

• Oral Therapies

This category includes various medications that could be prescribed to patients suffering from endometriosis, focusing on pain management and hormonal regulation.

• In-Office and Non-Invasive Therapies

This category encompasses treatments that can be administered in an office setting or through non-invasive means, such as physical therapies, neuromuscular electrical stimulation units, and trigger point or botox injections aimed at alleviating pain and restoring musculoskeletal function.

• Invasive Treatments

This category involves more specialized procedures, such as Botox injections and hypogastric nerve blocks, which are typically conducted in specialized facilities for cases of persistent and severe debilitation due to endometriosis.

3.1. Oral Therapies

Neuromodulators are a significant part of oral therapies commonly used to alleviate chronic pain associated with endometriosis. These medications exert their effects on the nervous system by altering the way nerves transmit pain signals from endometriosis lesions

to the brain, thereby decreasing central sensitization. A study conducted by Pereira et al. in 2022 measured the effectiveness of neuromodulators on patients suffering from debilitating nociceptive and neuropathic pain related to endometriosis [6]. In this study, six patients aged 25 to 52 years, who reported pain intensity ranging from 5.5 to 10 on the VAS scale, were treated with neuromodulators such as amitriptyline, gabapentin, and pregabalin. Patient education and counseling were also provided throughout the oral therapy regimen to ensure medication adherence and manage side effects. After following their prescribed regimen for two months, 43% of these patients reported decreased pain.

3.2. In-Office and Non-Invasive Therapies

3.2.1. Physical Therapies

Oral therapies can be combined with various pain management interventions that can be performed in small office settings without the need for specialized equipment. These measures are often considered for patients with persistent pain symptoms that do not adequately respond to a single form of treatment. Pereira et al. (2022) also explored physical therapy for patients suffering from endometriosis-related myofascial pain syndrome [6]. After failing to respond to oral therapies alone, muscle relaxants such as 5 mg vaginal diazepam were administered to these patients every 48 hours until the start of physical therapy. The physical therapy treatments included manual therapy, tissue mobilization, biofeedback, transcutaneous electrical nerve stimulation, and posterior tibial nerve stimulation. Among those who received physical therapy, 50% reported an improvement in their pain symptoms.

3.2.2. Neuromuscular Electrical Stimulation (NMES) Units

NMES units are a non-invasive and cost-effective form of therapy that PM&R physicians can use in small office settings to treat pain symptoms related to endometriosis. NMES relieve pain by stimulating muscle contractions, which improve pelvic floor muscle function and alter the pain perception of hypersensitized nerves. A study by Bi et al. (2019) evaluated the effectiveness of NMES for treating endometriosis-related pain [14]. Out of 154 patients, 83 women diagnosed with endometriosis quantified their pain levels and symptom severity using the Numerical Rating Scale (NRS) and the Endometriosis Symptom Severity Scale (ESS). Patients were followed up after 5 and 10 weeks of treatment with NMES. While there was no significant difference in pain and symptom severity at the 5-week follow-up, NRS and ESS scores showed significant improvement at the 10-week follow-up.

3.2.3. Trigger Point Injections (TPIs) and Botulinum Toxin Injections (BTXAs)

Injection treatment is another minimally invasive procedure that can be performed in small office settings to manage refractory pain and symptoms related to endometriosis. Pereira et al. (2022) combined physical therapy treatments with TPIs or BTXAs to treat hypersensitive nodules in women that amplified their endometriosis-related pain [6]. Approximately 70-80% of patients who received TPIs or BTXAs reported decreased pain symptoms.

Additionally, the study found that endometriosis-related symptoms such as constipation, urinary retention or incontinence, and fecal incontinence resolved over the course of three months. A similar study by Plavnik et al. (2019) examined the effect of TPIs on patients with chronic pelvic pain associated with endometriosis [15]. In this study, 16 women diagnosed with endometriosis were treated with TPIs targeting the pelvic floor muscles. Pain scores on the VAS scale decreased significantly three months post-treatment compared to baseline, and functional scores improved in categories measuring bladder and bowel incontinence, walking, sleeping, working, running, and lifting.

3.3. Invasive Treatments

In cases of more persistent pain and debilitating symptoms due to endometriosis, PM&R physicians can offer more invasive treatment options such as nerve blocks in specialized outpatient facilities. The hypogastric plexus, a bundle of nerves responsible for transmitting pain signals from the pelvic organs to the brain, is a significant focus in the medical world for treating endometriosis-related pain. The goal of nerve blocks in the hypogastric plexus is to prevent hypersensitive nerve fibers from sending pain signals to the brain. A study by Schultz (2007) evaluated the effectiveness of an inferior hypogastric plexus blockade in managing chronic pelvic pain, including pain specifically associated with endometriosis [10]. Eleven women were asked to rate their pain on the VAS scale prior to the intervention and were then administered an inferior hypogastric plexus blockade. Thirty to sixty minutes after the procedure, 73% of patients reported a significant reduction in pain scores. A similar study by Khodaveri et al. (2021) examined the effectiveness of a superior hypogastric plexus block to treat chronic pelvic pain related to endometriosis [16]. Sixteen patients diagnosed with endometriosis who received the block reported a significant reduction in VAS scores at 1, 2, 4, and 8 months post-procedure.

4. Discussion

PM&R specialists play an integral role in the care team for endometriosis patients by leveraging their expertise to address both pelvic pain and musculoskeletal dysfunction. Through targeted treatments, they are well-equipped to manage these distinct types of pain while also restoring essential functions such as normal bladder or bowel control, pelvic organ stability, and sexual health. The use of pain management strategies, combined with the collaborative efforts of gynecologists and other specialists, ensures a holistic approach to patient care. The treatment options identified in our research were categorized from the least invasive to the most invasive interventions, with the aim of creating a multimodal treatment regimen focused on alleviating pain and restoring fundamental musculoskeletal function for women suffering from endometriosis.

Physical therapy offers an excellent first-line option for physicians and patients aiming to strengthen pelvic muscles impacted by endometriosis. This condition frequently causes chronic pelvic pain, which can lead to severe muscle tightness and spasms in

the pelvic floor and lower back muscles. These abnormalities often result in pain during intercourse, difficulties with urination or defecation, and poor posture. By focusing on improving the overall functional capacity of the targeted muscles, the study by Pereira et al. (2022) employed a physical therapy approach that encouraged patients to actively engage in their own care, leading to more effective long-term management of their symptoms [6].

PM&R specialists may prescribe oral medications alongside physical therapy for patients experiencing persistent pain due to endometriosis. Oral therapies, such as neuromodulators, target the biochemical aspects of pain [6]. Medications like amitriptyline, gabapentin, and pregabalin can modify pain perception by altering the nervous system. Endometriosis often leads to central sensitization, a condition where the brain becomes excessively sensitive to pain stimuli, resulting in an increased pain response to both painful and non-painful stimuli [6]. Addressing this heightened pain response is particularly important since endometriosis can cause intensified pain from lesions not only in the pelvic floor but also in areas beyond. By integrating oral medications to manage the neurological aspects of pain with physical therapy to address musculoskeletal dysfunction, physicians can employ a comprehensive, non-invasive approach that promotes effective and sustainable pain management strategies.

NMES is another non-invasive option that physicians might include in a patient's treatment plan to address centralized pain and motor dysfunction associated with endometriosis. By stimulating the nerves and muscles affected by the disease, NMES can help alleviate centralized pain [14]. Additionally, it can relax spasming pelvic floor and lower back muscles, potentially reducing symptoms like urinary incontinence and constipation. Bi et al. (2018) provided valuable insights into the relatively unexplored use of NMES as either an alternative or complementary treatment for endometriosis-related pain [14].

When first-line, non-invasive treatments fail to restore the functional capacity of endometriosis patients, PM&R specialists may choose to discuss minor but more invasive interventions such as TPIs or BTXAs. Multiple studies have shown that these in-office injection procedures are effective in reducing pain symptoms, as well as musculoskeletal dysfunctions, in women who suffer from endometriosis [6, 15]. Identifying and treating specific trigger points in muscles implicated in endometriosis pathology such as pelvic floor muscles, abdominal muscles, and hip or lower back muscles can help alleviate localized and referred pain. The study of Pereira et al. (2022) outlined an impressive multimodal treatment regimen to treat endometriosis because the tiers of treatment targeted non-responders to conventional therapies such as neuromodulators and physical therapy [6]. By examining the effect of TPIs or BTXAs on persistent CPP, the study began a discourse on how to address a major unmet clinical need among treatment-resistant endometriosis patients.

PM&R specialists may choose to use hypogastric plexus blocks as a more invasive, last line of treatment for patients with endometriosis. Peripheral nerve entrapment is an often unrecognized cause of pain and disability in endometriosis, making proper diagnosis and treatment crucial for achieving appropriate pain reduction. Patients experiencing peripheral nerve pain can benefit from targeted peripheral nerve blocks based on the pain location [11]. Yang et al. (2018) and explores a novel therapeutic option that ensures the precision of a neurolytic block through the assistance of computed tomography [7].

5. Conclusion

Endometriosis presents a multifaceted challenge in both diagnosis and management, necessitating a collaborative and multidisciplinary approach for optimal patient outcomes [1]. Within this framework, PM&R specialists assume a central role in the continuum of care for individuals with endometriosis. Leveraging their expertise in musculoskeletal assessment, conservative interventions, and rehabilitation strategies, PM&R teams address the diverse physical manifestations associated with the condition [5].

Through thorough musculoskeletal evaluations, PM&R physicians can identify and address a range of physical issues linked to endometriosis, including pelvic floor dysfunction, myofascial pain, and biomechanical irregularities [3]. By understanding the intricate interplay between these musculoskeletal issues and the patient's overall health status, PM&R specialists work alongside their gynecological counterparts to develop tailored treatment plans aimed at mitigating pain, restoring function, and improving overall quality of life [4].

By integrating PM&R expertise into the multidisciplinary care team, we can improve the quality of life for women with endometriosis, addressing not only their pain but also their overall functional capacity and well-being. Further studies should focus on optimizing these collaborative approaches, ensuring that all patients have access to the most effective and comprehensive care possible. There is also a need for further research in the areas of long-term outcomes and the development of standardized treatment protocols.

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