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Endometriosis Management Beyond Hormonal and Surgical Options- Focus on Physical Activity as Adjunct Therapy

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Abstract

Introduction:

Endometriosis is a chronic, estrogen-dependent inflammatory disorder affecting millions of women worldwide, often causing debilitating pelvic pain, infertility, and significant reductions in quality of life. Although hormonal and surgical treatments remain the standard of care, many

patients experience persistent symptoms or intolerable side effects, underscoring the need for complementary and alternative approaches.

Aim of the Study:

This review aims to synthesize current evidence on alternative treatments for endometriosis, with a particular focus on the potential roles of physical activity and physiotherapy, while highlighting critical gaps in the existing research.

Materials and Methods

The review covers publications published in 2003-2025. The search for publications in the Pubmed electronic database was carried out using the following keywords: endometriosis, inflammation, physical activity, pelvic floor muscles, inflammaging, physiotherapy, pathogenesis, cytokines.

Conclusions : Preliminary studies suggest that regular physical activity and targeted physiotherapy interventions may alleviate pain, reduce inflammation, and improve psychological well-being in women with endometriosis. However, current evidence is limited by small sample sizes, inconsistent methodologies, and short follow-up periods. There is an urgent need for well-designed, large-scale research focusing specifically on women with endometriosis to evaluate alternative treatment strategies. Future studies should systematically assess the types, intensities, and durations of physical activity that are most effective, and rigorously investigate the benefits and risks of hormonal therapies. Without robust data, clinicians cannot offer clear, evidence-based recommendations, making further research essential to improve outcomes and quality of life for women affected by this complex condition.

Key words: endometriosis, hormonal therapy, inflammation, physical activity, physiotherapy

Introduction

Endometriosis is a chronic, inflammatory condition, where estrogen-dependent mechanisms lead to endometrial-like tissue developing outside of the uterine cavity, and affects approximately 6-10% of women of reproductive age. (1) The symptoms commonly associated with the disease are debilitating and include chronic pelvic pain, dysmenorrhea, dyspareunia and infertility, thus severely impairing daily function and quality of life of those suffering from it. The standard treatment options for endometriosis tend to focus on pain management and

controlling the progression of lesions through hormonal therapies and surgical interventions. Nevertheless, these approaches alleviate only some of the symptoms, come with potential side effect, and do not provide the best solution for all patients.

In recent years, a number of complementary strategies such as physical activity, structured exercise programs, and specialised physiotherapy, have grown in popularity as adjunctive methods to the standardised treatments, with the objective to improve the outcomes of patients with endometriosis. Regular exercise has been shown to regulate inflammatory pathways, alleviate chronic pain, and enhance psychological well-being. Pelvic floor dysfunction, muscle tension and limited mobility can be addressed with targeted physiotherapy, improving quality of life and alleviating some of the pain.

Although the alternative methods are slowly being integrated into the standardised treatment of endometriosis, their use remains limited, and the evidence base is still evolving.

Therefore, the aim of this article is to examine the current knowledge on the importance of sport and physiotherapy in the management of endometriosis, and to highlight their possible benefits. In addition, it will provide an overview of their mechanisms of actions, as well as the practical considerations of incorporating them into individualised care plans. (2-4)

Epidemiology

The nonspecific symptoms of endometriosis and the necessity for invasive procedures to confirm its presence, often lead the disease being under diagnosed or diagnosed late, making the estimation of the true prevalence of it challenging. It is currently estimated that endometriosis affects approximately 6-10% of women of reproductive age worldwide, (3-4) with the quota reaching 30-50% among women with infertility. (5) The reported incidence rates vary between 1 and 3 cases per 1,000 women per year, but these are likely underestimated. (6-7) There is a wide variability in the epidemiological data across regions, primarily attributed to differences in diagnostic criteria, study populations, and healthcare access. In diagnostic criteria, this variability suggests a disparity in the estimations of the prevalence rates, dependent on whether the diagnosis is confirmed by clinical symptoms alone, or through surgical evaluation. Differences in study populations, such as variations in age groups, reproductive history, ethnicity, and comorbidities, further complicate drawing common conclusions across the different studies. In addition, unequal access to healthcare and specialized gynecological services across countries and within regions can cause the patients to be diagnosed late or even hinder the diagnosis entirely. This disparity is particularly evident in low-resource settings.

Together, these factors make it impossible to estimate the actual prevalence of endometriosis on a global scale. (7)

Symptoms and impact

Endometriosis can manifest with a wide range of symptoms, and their severity often does not reflect the extent of the disease found through imaging or surgery. The disease may remain asymptomatic in women with advanced endometriosis, whereas those with less advanced cases may experience severe and debilitating symptoms. This discrepancy is mainly based on the specific location of the endometriotic lesions. Implants in the uterosacral ligaments, rectovaginal septum, or bladder often cause the patient to suffer from more intense pain and dysfunction, despite the extent of the disease being limited. (8-9) Chronic pelvic pain is the most common symptom, and it often intensifies during menstruation (dysmenorrhea), ovulation, sexual intercourse (dyspareunia), or bowel movements (dyschezia).(10) Gastrointestinal disturbances like bloating, nausea, and alterations in bowel movements (constipation, diarrhea, or irritable bowel syndrome-like complaints), commonly occur, particularly during menstruation. (11) A sense of urinary urgency, increased frequency of urination, painful voiding (dysuria), and even urinary incontinence are reported more commonly among women with endometriosis compared to those without the disease. (12) The combination of chronic pain, systemic inflammation, poor sleep and psychological stress is thought to lead to severe fatigue, which is another frequent symptom of the disease. Moreover, endometriosis is recognised as one of the leading causes of infertility, affecting 30–50% of women who experience difficulties conceiving. The mechanisms responsible for infertility in endometriosis involve pelvic adhesions that distort the reproductive anatomy, inflammatory processes that compromise the function of gametes and embryos and reduced endometrial receptivity that diminishes the chances of successful implantation.(13) The combination of chronic pain, sexual dysfunction, and fertility issues imposes a substantial psychological strain, often leading to depression, anxiety and substantial decrease in quality of life.(14)

Pathogenesis

The pathogenesis of endometriosis is complex and multifactorial, involving several overlapping biological mechanisms. The most widely accepted hypothesis is retrograde menstruation theory. It suggests that during menstruation, endometrial cells can flow backward through the fallopian tubes into the pelvic cavity, where they attach to the peritoneum or pelvic organs and subsequently invade, implant, and proliferate to form endometriotic lesions. However, since

many women of reproductive age experience retrograde menstruation, and not all develop endometriosis, other mechanisms must also be responsible. (15)

Immune system dysfunction and dysregulation plays a significant role in the pathogenesis of endometriosis. In healthy women, immune cells in the peritoneal cavity clear refluxed endometrial cells during retrograde menstruation. Impaired clearance of ectopic endometrial cells by peritoneal macrophages, dysregulated natural killer cell activity, (16-17) and increased production of pro-inflammatory cytokines, such as interleukin-1β, interleukin-6, and tumor necrosis factor-α, create a local immune environment that allows ectopic tissue to avoid recognition and elimination by immune cells. This leads to chronic inflammation, which in turn promotes endometrial lesions growth, angiogenesis, and fibrosis.(18)

Hormonal factors, particularly estrogen production, play a fundamental role in the development and progression of endometriosis. Estrogen promotes the proliferation and survival of both eutopic and ectopic endometrial cells. (19) Unregulated aromatase activity often increases local estrogen synthesis, enhancing the conversion of androgens to estrogens directly within the ectopic tissue. (20) The self-perpetuating loop of inflammation and lesion growth that this creates, additionally activates estrogen signaling pathways, as elevated estrogen levels further drive the production of pro-inflammatory cytokines and prostaglandins. (21)

Moreover, women with endometriosis frequently demonstrate progesterone resistance in both eutopic and ectopic endometrial tissue which has a pivotal role in perpetuating the disease. The alterations in the expression and function of progesterone receptors result in insufficient response to circulating progesterone. This compromised signaling interferes with normal decidualization and cyclical endometrial remodeling, thereby impairing the endometrium's capacity to establish a receptive environment for embryo implantation.(22)The abnormal endometrial remodeling additionally contributes to aberrant extracellular matrix turnover by dysregulating matrix metalloproteinases and their inhibitors, thereby facilitating endometrial tissue invasion and persistence of ectopic implants. Furthermore, deficient progesterone activity fails to adequately suppress pro-inflammatory pathways, leading to sustained production of cytokines, chemokines, and prostaglandins that fuel chronic inflammation in the pelvic environment. These hormonal disturbances collectively create a microenvironment that favors disease progression, further spread and deeper penetration of endometriotic lesions into surrounding tissues, increased angiogenesis that sustains lesion growth, and persistent inflammation that perpetuates pain and tissue damage.(23-25)

Traditional Medical Treatments in Endometriosis

The clinical guidelines currently recommend a more pragmatic approach to the management of endometriosis, prioritising individualised treatment choices, catered to the severity of symptoms, the patient's age, fertility and reproductive plans, and the effectiveness of previous therapies. (27)

Pain Management in Endometriosis

First-line strategies of effective pain management include nonsteroidal anti-inflammatory drugs (NSAIDs), which reduce prostaglandin synthesis and alleviate dysmenorrhea and non-cyclic pelvic pain, although evidence for their impact on disease progression is limited. (28) (29) Hormonal therapies, such as combines oral contraceptives, can alleviate the painful symptoms, by suppressing ovulation and menstrual bleeding, thus reducing cyclical pain triggers. (30) For women with persistent or severe pain, second-line options include gonadotropin-releasing hormone (GnRH) agonists or antagonists, These agents create a hypoestrogenic state that effectively suppresses endometriotic lesion activity and alleviates pain. (27) However, side effects of prolonged estrogen suppression demand careful monitoring and add-back therapy should be used to maintain bone health and minimize hypoestrogenic symptoms. (31) In cases of persistent, treatment-resistant pain, aromatase inhibitors may be considered, often combined with other hormonal agents to prevent ovarian stimulation. (32)

Advantages and Disadvantages of Hormonal Therapy in Endometriosis

Hormonal therapy offers several key advantages in the management of endometriosis. It effectively reduces or eliminates menstrual bleeding and ovulation, thereby decreasing cyclical pain and suppressing the activity of ectopic endometrial implants. Hormonal treatments such as combined oral contraceptives, progestins, and GnRH can lead to substantial improvement in symptoms such as dysmenorrhea, dyspareunia, and chronic pelvic pain. These therapies are widely available, generally non-invasive, can be used long-term in many women and generally have few absolute contraindications, making them suitable for most women with endometriosis. Therefore, they provide an accessible and preferred initial strategy for effective symptom control. (33) Additionally, hormonal therapy can stabilise disease progression, reducing the risk of lesion growth during treatment. (34)

However, hormonal therapy also has some notable disadvantages. While hormonal therapy effectively suppresses lesion activity during use, it does not eradicate existing endometriotic

implants, which often leads to symptom recurrence after treatment is stopped, hence masking the symptoms of the disease, rather than actually treating it. (35)Hormonal therapies may be associated with various adverse effects, such as emotional lability, weight gain, reduced sexual desire and irregular breakthrough bleedings. Moreover, as their mechanism of action involves ovulation suppression, hormonal therapy is a less suitable option for patients who are planning to conceive. (27,35,36)

First-line pharmacological options include combined oral contraceptives or progestin-only therapies, which reduce menstrual flow and suppress ovulation, thereby lowering estrogen levels and alleviating pain. Progestins such as dienogest or norethindrone acetate are effective in inducing a hypoestrogenic state that limits endometrial proliferation.

For patients with persistent or severe symptoms, second-line therapies include gonadotropin-releasing hormone (GnRH) agonists or antagonists, which suppress ovarian estrogen production more completely, inducing a reversible hypoestrogenic state. However, these treatments can lead to menopausal-like side effects, including hot flashes and reduced bone mineral density. Another option includes androgenic agents like danazol, although their use is limited by androgenic side effects, including weight gain, acne, hirsutism, voice deepening, and adverse lipid profile changes. (37)

As evident, medical therapies are only effective in alleviating the pain and suppressing development of the disease, but do not actually treat it, failing to eradicate endometriotic implants and hinder the symptoms from coming back after the treatment is discontinued. Therefore, treatment options must take into account the individual needs of the patient, aiming to balance symptom relief, side effects, fertility goals, and patient preferences, periodically reassessing treatment efficacy and tolerability.

Surgical Treatment in Endometriosis

It is essential to consider more invasive treatment options, as in cases of severe pain refractory to medical therapy, deep infiltrating disease, or where the anatomical distortion contributes to infertility, surgical intervention may be the only option. However, it is now well established that not all women diagnosed with endometriosis require surgical treatment; many patients can achieve effective symptom control with hormonal therapy alone. (38)

Historically, diagnostic laparoscopy was considered the gold standard for confirming endometriosis, as it allowed direct visualisation and histological confirmation of lesions. (39)

Nevertheless, since the invasiveness of the procedure and the increased risk of postoperative adhesion formation may worsen chronic pain and reduce fertility potential, the current guidelines discourage diagnostic laparoscopy as a first-line diagnostic tool. (27)

Instead, advances in imaging have led to the adoption of non-invasive methods such as magnetic resonance imaging (MRI) and transvaginal ultrasound with an endometriosis-specific protocol, which can reliably detect deep infiltrating endometriosis and ovarian endometriomas in experienced hands.(27,40) A significant limitation of these non-invasive methods is that their diagnostic accuracy is highly dependent on the expertise of the operator and the imaging team. Not all gynecologists have the specialized training necessary to perform or interpret these examinations reliably. (41) If the patient is considered a suitable candidate for surgery, the objective should be the complete excision of all visible endometriotic lesions, rather than limiting the procedure to a single anatomical site, such as ovarian endometriomas alone.(42) Selective removal of lesions only from the ovary has been shown to be insufficient, as it does not address disease sites that may contribute to persistent pain and impaired fertility, ultimately limiting improvements in both quality of life and reproductive outcomes. (43-44) For these reasons, it is essential to carefully select patients who are appropriate candidates for surgery, as well as to perform thorough preoperative assessment of disease severity and precise mapping of all endometriotic lesions to guide comprehensive surgical planning. (45)

The role of physical exercise

The positive impact of regular physical activity on overall health and well-being is extensively supported by robust scientific evidence. Regular exercise can help with reducing the risk of developing several chronic diseases, such as cardiovascular disease, osteoporosis, metabolic syndrome, type 2 diabetes and certain types of cancer. (46)

Furthermore, these chronic conditions, among others, are known to be linked to an underlying state of persistent low-grade inflammation, which shapes their pathophysiology.(47–51) Chronic systemic inflammation contributes to dysregulation of immune responses, promotes oxidative stress, and alters cytokine profiles, creating a pro-inflammatory environment that can lead to disease progression. (52–54)

In the context of endometriosis, engaging in regular physical activity may apply significant benefits not only by reducing systemic inflammation, but also by facilitating the maintenance of a negative energy balance, which reduces the risk of adipose tissue accumulation.

Excess adipose tissue is recognised as a metabolically active, which means that it functions as an endocrine organ capable of secreting pro-inflammatory adipokines, including interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α), which play an essential role in the pathogenesis of endometriosis. These mediators contribute to the continuation of systemic low-grade inflammation and lead to progression of the disease. In addition, adipose tissue expresses aromatase, an enzyme catalysing the conversion of androgens into estrogens, thereby increasing systemic estrogen levels, which may potentially exacerbate estrogen-dependent diseases such as endometriosis.

Therefore, maintaining a healthy body composition through regular exercise may allow the patients to regulate systemic inflammation and peripheral estrogen synthesis, ultimately supplying a supportive strategy to improve symptom control and overall health in women with endometriosis. (55)

Dysfunction of the pelvic floor muscles, often presenting with hypertonicity, frequently develops in women with endometriosis, which can ultimately contribute to the development of chronic pelvic pain, increased muscle tension and altered neuromuscular control. (56-57) Pelvic floor physiotherapy, including manual therapy, can effectively reduce pelvic floor hypertonicity, alleviate pain, and improve functional mobility. (56,58,59)

Furthermore, the mechanical stimulation and relaxation of pelvic floor muscles achieved during therapy enhance local blood flow, which can potentially lead to the reduction of inflammatory mediators by promoting the clearance of pro-inflammatory cytokines and facilitating the release of endogenous anti-inflammatory modulators. (60)

Therefore, incorporating optimal and tailored to the patient pelvic floor physical therapy into treatment plans for women with endometriosis may offer both direct analgesic effects and indirect benefits through modulation of pelvic inflammation. However, in order to confirm these effects and incorporate them into standardised treatment protocols, further research is needed. (61)

Summary and conslusion

Endometriosis remains a complex, multifactorial, chronic inflammatory disease that significantly reduces overall quality of life. Despite advances in hormonal and surgical therapies, many patients experience chronic pain and impaired fertility, highlighting the urgent need for alternative and complementary treatment strategies. While hormonal and surgical

interventions remain fundamental components of treatment, they may not completely alleviate the symptoms or address functional impairments associated with pelvic floor dysfunction. Incorporating regular physical activity and pelvic floor physiotherapy can play a valuable role in the management of endometriosis-related pain. These interventions can possibly reduce pelvic muscle hypertonicity, improve neuromuscular control, and enhance local circulation, potentially leading to the modulation of pelvic inflammation and reduced pain intensity. Despite encouraging initial evidence, further high-quality research is essential to validate these outcomes, optimise therapeutic protocols, and integrate individualised exercise and physiotherapy regimens into comprehensive, multidisciplinary care strategies for women affected by endometriosis. Moreover, future research should prioritise women-centred study designs that account for hormonal fluctuations, disease heterogeneity, and individual patient needs. Without high-quality, adequately powered randomised controlled trials, with long term follow-up, it will not be possible to establish evidence-based guidelines or to fully understand the potential of exercise and other complementary methods as part of comprehensive endometriosis care. Currently, the lack of robust data hinders clear clinical recommendations, highlighting the pressing need for research addressing women's unique physiology.

Disclosure:

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2. Methodology: Beata Imbirska, Michalina Janiszewska
3. Software: Michał Hładki
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5. Formal Analysis: Natalia Ramlau
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10. Writing – Review & Editing: Natalia Ramlau, Beata Imbirska
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