REVIEW ARTICLE

Managing Common Gynecologic Disorders: Clinical Approaches to PCOS, Endometriosis, and Uterine Fibroids

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KEYWORDS

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ABSTRACT

Polycystic ovary syndrome (PCOS), endometriosis, and uterine fibroids are highly prevalent gynecologic conditions that often lead to pelvic pain, menstrual irregularities, and infertility. While standard treatment relies on hormonal therapy and surgery, there is growing interest in integrative, nonpharmacologic approaches, including OMT. This review summarizes current diagnostic and treatment strategies for PCOS, fibroids, and endometriosis, and explores the role of OMT in their management.

A targeted PubMed and Cochrane Library search identified 26 relevant studies for PCOS, 18 for fibroids, 19 for endometriosis, and 8 for osteopathic interventions. Evidence supports lifestyle changes and medications like metformin and letrozole for PCOS, while uterine fibroids are managed surgically or with newer interventional and hormonal options. Endometriosis treatment includes medical suppression and excision, with emerging diagnostic biomarkers and imaging tools.

OMT shows promise in reducing pelvic pain and enhancing quality of life, particularly in endometriosis and PCOS, by addressing musculoskeletal and autonomic dysfunction. Although direct evidence remains limited, osteopathic care may complement conventional treatment. Further research is warranted to define its clinical utility in multidisciplinary gynecologic care.

INTRODUCTION

Polycystic ovary syndrome (PCOS), endometriosis, and uterine fibroids are among the most common gynecologic disorders encountered in primary care. Each condition can significantly impact women's health and quality of life, contributing to symptoms such as menstrual irregularities, chronic pelvic pain, subfertility, and other systemic effects. PCOS affects an estimated 6%–9% of reproductive-aged women, often presenting with hyperandrogenism, ovulatory dysfunction, and metabolic disturbances.[1]

Uterine fibroids (leiomyomas) are extremely prevalent, occurring in up to 70% of women by menopause,[2] and are the leading indication for hysterectomy.[3] Given their prevalence and impact, osteopathic family physicians play a crucial role in managing these disorders.

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Endometriosis, a chronic inflammatory condition characterized by ectopic endometrial tissue, is found in roughly 6%–10% of women of reproductive age and in a high proportion of those with chronic pelvic pain or infertility.[4]

This article reviews current clinical management of PCOS, endometriosis, and fibroids, emphasizing recent advances in hormonal therapies and medical management. Additionally, it discusses how osteopathic principles such as holistic patient-centered care can be applied in treating these conditions.

METHODS

A comprehensive literature review was conducted using PubMed and the Cochrane Library to identify recent human studies (published within the past 5 years) on PCOS, uterine fibroids, endometriosis, and osteopathic considerations for these conditions. We performed a systematic literature search in the PubMed database to identify relevant articles on the diagnosis and treatment of PCOS in adult women in the United States. We excluded

studies on etiology, pathogenesis, and those conducted internationally. This yielded 652 results, of which 16 were included after removing duplicates and irrelevant articles. A Cochrane Library search for PCOS returned 25 results, with 9 included, resulting in a total of 25 sources for PCOS.

We then performed a systematic literature search in the PubMed database to identify relevant articles on diagnosis and treatment of uterine fibroids or leiomyomas in adult women in the United States. We excluded studies on etiology, pathogenesis, and those conducted internationally. This yielded 136 results, with 12 included. The Cochrane Library search for uterine fibroids returned 23 results, with 9 included, totaling 21 sources.

An additional systematic literature search in the PubMed database was done to identify relevant articles on diagnosis and treatment of endometriosis in adult women in the United States. We excluded studies on etiology, pathogenesis, and those conducted internationally. This yielded 101 results, with 14 included. A Cochrane Library search for endometriosis returned 10 results, of which 5 were included, yielding a total of 19 sources.

Finally, we performed a systematic literature search in the PubMed database to identify relevant articles on utilization of osteopathic manipulative medicine in adult women in the United States for the above conditions. This resulted in 72 studies, with 5 included. A Cochrane Library search for osteopathic medicine returned results, but none were relevant. Thus, 5 sources were used for osteopathic medicine.

RESULTS

Polycystic Ovary Syndrome

PCOS is a common endocrine disorder in reproductive-age women, affecting up to 10% globally.[5] It is highly variable, encompassing metabolic dysfunction, menstrual irregularities, hyperandrogenism, and infertility. Variations in phenotype, such as lean vs obese PCOS and differing degrees of insulin resistance, contribute to diagnostic and management complexity.[6,7]

Treatment

Lifestyle modification remains first-line therapy.[5] Interventions combining caloric restriction, exercise, and behavioral support have demonstrated significant weight loss, improved insulin sensitivity, and decreased testosterone, all which improve symptoms of PCOS.[7,8] High-intensity interval training (HIIT) is particularly effective for metabolic improvement.[9] Probiotic supplementation alongside lifestyle changes further improves body mass index (BMI) and hormonal parameters.[10]

Combined oral contraceptives (COCs) remain first-line pharmacologic therapy for managing hyperandrogenic symptoms and cycle regulation. Cochrane Library reviews show COCs are more effective than metformin for acne and hirsutism relief.[11] Progestogens alone can effectively control irregular bleeding.[12]

Insulin-sensitizing agents, such as metformin, help lower insulin levels, reduce androgen production, and improve ovulatory function.[13] Because infertility is a consequence of PCOS, pharmacologic therapies with lifestyle changes are recommended to boost fertility chances.

Combining metformin with clomiphene increases pregnancy rates compared to clomiphene alone.[14] Glucagon-like peptide-1 (GLP-1) receptor agonists (eg, liraglutide) offer additional weight loss and metabolic benefits, and possibly increase fertility chances.[15,16] They have demonstrated improved insulin sensitivity compared to metformin, with additional benefits in menstrual regularity and androgen reduction.[17] Thiazolidinediones also improve insulin resistance but carry risks of weight gain, an already known symptom of PCOS.[18]

Emerging Therapies

Anti-androgens remain pivotal for hirsutism and acne. Meta-analyses confirm their efficacy in reducing testosterone.[19] However, side effects and teratogenicity require careful contraceptive counseling.

Letrozole, an aromatase inhibitor, is now considered first line for ovulation induction, with higher live birth rates and fewer multiple pregnancies compared to clomiphene.[20] It is currently used off label for PCOS patients. Gonadotropins remain effective but carry higher risks of ovarian hyperstimulation.[21] Dexamethasone combined with clomiphene can improve ovulation in resistant cases.[22] Ultrasound-guided ovarian drilling improves ovulation in clomiphene-resistant women but carries surgical risks.[23]

Inositol supplementation may improve ovulation and metabolic profiles, though evidence remains low-quality.[24] N-acetylcysteine demonstrates modest benefits for reproductive outcomes and insulin sensitivity.[25] Carnitine and tea consumption are emerging adjuncts for metabolic control.[26,27] Curcumin combined with metformin shows synergistic improvements in testosterone and inflammation.[28]

Acupuncture is also gaining recognition as a complementary therapy for PCOS. Evidence from animal and clinical studies suggests acupuncture may regulate the hypothalamic-pituitary-ovarian axis, improve insulin sensitivity, reduce hyperandrogenism, and promote ovulation. It may also modulate key molecular pathways such as PI3K/AKT/mTOR and enhance ovarian angiogenesis. While not a

replacement for conventional therapies, acupuncture offers a nonpharmacologic option that may benefit patients with poor tolerance to medications or those seeking integrative approaches.[28]

Recent clinical trials have also explored novel pharmacotherapies for PCOS. Sodium-glucose cotransporter 2 (SGLT-2) inhibitors (eg, dapagliflozin) show promise in reducing body weight, insulin resistance, and androgen levels, while also improving cardiovascular markers. Dipeptidyl peptidase-4 (DPP-4) inhibitors (eg, sitagliptin) offer moderate metabolic benefits and may be suitable for patients intolerant to metformin.

Combination therapies, such as metformin with sitagliptin, have shown enhanced ovulation rates and embryo quality in assisted reproduction settings. These agents represent a shift toward individualized phenotype-specific treatment strategies in PCOS care.[17]

Additionally, gonadotropin-releasing hormone (GnRH) antagonists (eg, elagolix, relugolix, linzagolix), which are FDA approved for endometriosis, appear to offer a promising therapeutic option for managing the hormonal and metabolic dysfunctions associated with PCOS. Studies have shown that GnRH antagonist protocols lead to lower rates of ovarian hyperstimulation syndrome (OHSS), reduced stimulation duration, and gonadotropin consumption compared to GnRH agonist protocols. Their ability to lower androgen levels and potentially improve insulin sensitivity and metabolic health highlights their role in comprehensive PCOS management. However, further research is necessary to validate these benefits and fully elucidate the clinical significance and long-term safety of GnRH antagonist therapy in PCOS patients.[17]

Uterine Fibroids

Uterine fibroids (leiomyomas) are the most common benign gynecologic tumor in premenopausal women. Over 11 million women in the United States alone have been diagnosed with this condition based on history, physical examination, and some type of imaging, commonly pelvic ultrasound. Common symptom presentation includes pain, pressure, abnormal vaginal bleeding, possible infertility, and decreased quality of life. Treatment is focused on reducing signs and symptoms, decreasing fibroid volume, and maintaining or improving fertility outcomes. Based on individual preferences, standardized treatment may change.[30]

Treatment

The standard treatment for uterine fibroids is laparoscopic or open surgery, depending on the size of the fibroid. An open myomectomy removes the fibroid and is associated with shorter surgical procedural time. A laparoscopic myomectomy is less invasive and has advantageous postoperative benefits such as less blood loss, shorter hospital stays, fewer pelvic adhesions, and quicker return to normal activities. Both procedures have similar rates for fertility as well as fibroid recurrence postoperatively.[31]

Nonsurgical treatments have become more popular with advancing technology. Uterine artery embolization (UAE), high-intensity focused ultrasound (HIFU) or magnetic resonance imaging (MRI)-guided ablation, and percutaneous microwave ablation are three examples of this.[32,33] A large cohort study found myomectomy to be associated with lower long-term reintervention rates compared to UAE, endometrial ablation, and hysteroscopic myomectomy, especially in younger and fertile patients.

These findings are critical when counseling patients on uterus-preserving options years before menopause.[34] Mifepristone has also been added in conjunction with nonsurgical treatments to further decrease lesion volume and improve symptoms. It also helps to reduce the number of punctures and ablation treatment time.[35]

Currently, long-term pharmacologic options for fibroid treatment remain limited. COCs and progestin-only products are often used initially but lack FDA approval for fibroid-specific indications. Selective progesterone receptor modulators (SPRMs) such as mifepristone, ulipristal acetate, and asoprisnil effectively control bleeding and reduce fibroid size, though they are generally less effective than GnRH agonists like leuprolide acetate.[36] Hormonal therapy has shown limited efficacy in reducing symptoms as well as fibroid volume. Improved hemoglobin levels are present, but hormonal side effects have shown decreased quality of life.[37,38] Mifepristone alone has shown reduction in volume and heavy bleeding, improved hemoglobin levels, and decreased pelvic pain. Side effects include endometrial thickening, and the long-term safety of the medication is unclear.[39]

GnRH agonists (leuprolide, goserelin, triptorelin) are well-established for reducing fibroid volume and improving hemoglobin levels, but they induce hypoestrogenic side effects (eg, bone loss, hot flushes). Add-back therapy with low-dose estrogen/progestin helps mitigate these effects and maintain bone density, especially important for aging women.[40]

GnRH antagonists, a newer class of oral medications, have shown promise in treating heavy menstrual bleeding (HMB) associated with fibroids. These include elagolix, relugolix, and linzagolix, which offer rapid onset, reversibility, and dose titration to balance symptom control with minimal hypoestrogenic effects. However, long-term safety data are limited to 2-year studies, and symptoms typically resume after discontinuation. Cost-effectiveness analyses are still needed to guide broader clinical use.[41]

TABLE 1: Management for PCOS.

Treatment Option	Research Support	Mechanism/Procedure	Benefits	Limitations
Lifestyle modification	Yes – Strong evidence supports combined diet, exercise, and behavioral interventions	Caloric restriction, exercise (especially HIIT), behavioral support	Weight loss, improved insulin sensitivity, decreased testosterone, symptom improvement	Requires sustained effort and adherence
Probiotics	Mixed – Some studies show benefit when combined with lifestyle changes	Supplementation alongside lifestyle changes	Improved BMI and hormonal parameters	Limited standalone evidence
COCs	Yes – Cochrane Library reviews support efficacy for hyperandrogenic symptoms	Hormonal regulation via estrogen and progestin	Cycle regulation, acne and hirsutism relief	May not address metabolic dysfunction
Progestogens alone	Yes – Effective for controlling irregular bleeding	Hormonal therapy	Control irregular bleeding	Do not treat hyperandrogenism or metabolic issues
Metformin	Yes – Well-supported for insulin sensitization and ovulatory improvement	Insulin sensitizer	Lowers insulin, reduces androgens, improves ovulation	GI side effects, not effective for all symptoms
Metformin + clomiphene	Yes – Combination improves pregnancy rates over clomiphene alone	Ovulation induction with insulin sensitization	Enhanced fertility outcomes	Requires monitoring and may cause side effects
GLP-1 receptor agonists	Yes – Recent studies show metabolic and fertility benefits	Enhance insulin sensitivity, reduce weight, regulate menstruation	Improved insulin sensitivity, weight loss, androgen reduction	Cost, limited long-term data
Thiazolidinediones	Mixed – Effective for insulin resistance but cause weight gain	Insulin sensitizer	Improve insulin resistance	Weight gain risk
Anti-androgens	Yes – Meta-analyses confirm efficacy for hirsutism and acne	Block androgen receptors or reduce androgen production	Reduce testosterone, improve acne and hirsutism	Teratogenicity, require contraceptive counseling
Letrozole	Yes – Higher live birth rates and fewer multiple pregnancies than clomiphene	Aromatase inhibitor for ovulation induction	Effective ovulation induction	Off-label use, requires monitoring
Gonadotropins	Yes – Effective but with higher OHSS risk	Stimulate ovulation	Effective ovulation induction	OHSS risk, high cost
Dexamethasone + clomiphene	Mixed – Shown to help in resistant cases	Steroid plus ovulation induction	Improves ovulation in resistant cases	Steroid side effects
Ovarian drilling	Mixed – Effective in clomiphene-resistant women	Surgical intervention	Improves ovulation	Surgical risks
Inositol	Mixed – Some benefit but low-quality evidence	Supplementation	Improves ovulation and metabolic profile	Low-quality evidence
N-acetylcysteine	Mixed – Modest benefits reported	Antioxidant supplementation	Improves insulin sensitivity and reproductive outcomes	Limited efficacy
Carnitine and tea	Mixed – Emerging adjuncts with preliminary support	Dietary supplementation	Metabolic control	Limited evidence
Curcumin + metformin	Mixed – Synergistic effects reported	Anti-inflammatory and insulin sensitization	Improves testosterone and inflammation	Emerging evidence
Acupuncture	Mixed – Animal and clinical studies suggest benefit	Regulates HPO axis, modulates molecular pathways	Improves insulin sensitivity, ovulation, androgen levels	Not a replacement for conventional therapy
SGLT-2 inhibitors	Yes – Recent trials show metabolic and hormonal benefits	Reduce glucose reabsorption	Weight loss, improved insulin resistance and cardiovascular markers	Limited long-term data
DPP-4 inhibitors	Mixed – Moderate benefits, useful for metformin intolerance	Enhance incretin effect	Moderate metabolic benefits	Less effective than other agents
GnRH antagonists	Mixed – Promising but requires further validation	Suppress gonadotropin release	Lower OHSS risk, reduce androgens, improve insulin sensitivity	Need more research on long-term safety

Abbreviations: BMI, body mass index; DPP-4, dipeptidyl peptidase-4; GLP-1, glucagon-like-peptide-1; GnRH, gonadotropin-releasing hormone; OHSS, ovarian hyperstimulation syndrome; SGLT-2, sodium-glucose cotransporter-2

Other agents like danazol, a steroid hormone, and aromatase inhibitors have shown some efficacy in reducing fibroid size and bleeding, but their use is limited by side effects and inconsistent outcomes.[42,43]

Emerging Therapies

One emerging therapy includes collagenase injections directly into the fibroid itself. So far it has been safe and well tolerated with a reduction in collagen content in all treated samples. Optimal dose and interval for the injections has not been determined.[44] Interventional radiology may prove to be a promising field with new techniques including thermal ablation.[45] The Mirabilis system is a safe and noninvasive option for the outpatient setting for rapid and efficient ablation of uterine fibroids.[46]

Although research is limited, there is some evidence that integrative treatment options may be beneficial. High concentrations of vitamin D supplementation have been shown to decrease fibroid development.[47,48] Acupuncture in addition to mifepristone treatment was shown to further reduce fibroid volume.[49] Additionally, the Chinese herbal medicine Guizhi Fuling has been added to mifepristone treatment and has been shown to reduce heavy menstrual bleeding and subfertility. More research is needed to confirm and support these data.[50]

Healthy lifestyle changes such as regulating hormone levels, getting regular health assessments, and maintaining a nourishing diet are recommended for prevention of fibroids, although not guaranteed. There is some evidence of an anti-uterine fibroid diet to prevent development; however, more research is needed to determine if this is beneficial.[48]

Endometriosis

Endometriosis is a chronic, estrogen-dependent, inflammatory disease characterized by the presence of endometrial-like tissue outside the uterus, leading to pain, infertility, and often systemic inflammation and central sensitization.[51,52] This disease affects approximately 6%–10% of reproductive-aged women, or 6.5 million, with increased prevalence in those experiencing infertility or chronic pelvic pain.[52,53] Because of an endometriosis-related stigma, mean diagnostic delays range between 7–11 years. Additional symptoms include dysmenorrhea, dyspareunia, and gastrointestinal and urinary symptoms, depending on lesion location.[51]

Diagnosing endometriosis historically requires surgical confirmation via laparoscopy.[54,55] Current diagnostic strategies include: transvaginal ultrasound, MRI, and plasma/serum biomarkers, which show promising diagnostic potential using miRNAs, proteins, and metabolites.[53,56,57] Ultrasound is the first-line diagnostic test for ovarian/superficial disease (specificity >90%), while MRI better detects deep, complex, or recurrent cases (sensitivity >95%).[58] This algorithm is proposed to optimize diagnostic accuracy and resource allocation: start with ultrasound, escalate to MRI when needed.[58,59] Various studies support use of metabolomics as early noninvasive biomarkers for endometriosis, potentially reducing invasive procedures and delays.[53,56,57]

Other articles support comprehensive nonsurgical diagnostic pathways using symptoms, checklists, imaging, biomarkers, and AI models to reduce reliance on laparoscopy, enabling faster, safer, and more precise evaluation.[54,60] Current guidelines recommend combining clinical history, imaging, and biomarkers before considering diagnostic surgery. They emphasize timely, holistic, and equity-informed care.[52]

Treatment

Options include surgery consisting of laparoscopic excision or ablation. Laparoscopy remains the gold standard for treatment. Surgery can also improve fertility in selected patients.[55] Minimally invasive treatments include ultrasound-guided ethanol sclerotherapy, which is effective for ovarian endometriomas, with low recurrence and ovarian-reserve preservation.[61] Pre-operative hormonal suppression may ease surgery but does not improve long-term pain outcomes.[62]

First-line medicinal treatments include COCs, progestins, and nonsteroidal anti-inflammatory drugs (NSAIDs).[52,54] GnRH analogues (eg, leuprolide [Lupron Depot]), goserelin (Zoladex), nafarelin (Synarel), triptorelin (Decapeptyl SR) are effective for endometriosis-associated pain with expected side effects that include menopausal symptoms and bone mineral density loss. Add-back hormone therapy (eg, norethisterone acetate, medroxyprogesterone acetate [MPA], tibolone) helps mitigate these effects.[63]

Elagolix, an oral GnRH antagonist, received FDA approval in July 2018 for management of moderate to severe endometriosis-associated pain. It is the first oral treatment approved for this indication in over a decade and works to suppress luteinizing hormone (LH), follicle-stimulating hormone (FSH), estradiol, and progesterone in a dose-dependent manner. This drug has shown an improvement in dysmenorrhea, nonmenstrual pelvic pain, and dyspareunia compared to placebo.[64]

Pentoxifylline, an immunomodulator, has been studied in endometriosis-associated pain and infertility, but there was insufficient evidence to support its use.[65] A previous Cochrane Library review looked at SERMs (eg, raloxifene), which resulted in uncertainty of the effects on pain relief. The evidence was low quality with a small sample size, but current data do not support the use of SERMs for

TABLE 2: Management for uterine fibroids.

Treatment Option	Research Support	Mechanism/Procedure	Benefits	Limitations
Open myomectomy	Yes – Well-established surgical method	Surgical removal of fibroid via open procedure	Shorter procedural time	More invasive, longer recovery
Laparoscopic myomectomy	Yes – Supported by clinical outcomes	Minimally invasive fibroid removal	Less blood loss, quicker recovery	Technically demanding, equipment-dependent
UAE	Mixed – Effective but higher reintervention rates	Blocking blood supply to fibroid	Minimally invasive, symptom relief	Higher recurrence, not ideal for fertility preservation
HIFU	Mixed – Promising but limited long-term data	MRI-guided thermal ablation	Noninvasive, outpatient procedure	Limited availability, uncertain long-term efficacy
Percutaneous microwave ablation	Mixed – Emerging with limited data	Thermal destruction of fibroid tissue	Minimally invasive	Limited research, long-term outcomes unclear
Mifepristone (with ablation)	Yes – Improves outcomes with ablation	Hormonal modulation and lesion shrinkage	Reduces lesion volume and treatment time	Endometrial thickening, unclear long-term safety
COCs	Mixed – Used off label	Hormonal regulation	Controls bleeding	Not FDA approved for fibroids, limited efficacy
Progestin-only products	Mixed – Initial use, limited efficacy	Hormonal regulation	Control bleeding	Limited fibroid-specific benefit
SPRMs	Yes – Effective for bleeding and size reduction	Modulate progesterone receptors	Reduce fibroid size and bleeding	Less effective than GnRH agonists
GnRH agonists	Yes – Well-established	Suppress estrogen production	Shrink fibroids, improve hemoglobin	Hypoestrogenic side effects, bone loss
GnRH agonists + add-back therapy	Yes – Well-established	Hormone suppression + add-back estrogen/progestin	Preserves bone density, reduces side effects	Complex regimen, requires monitoring
GnRH antagonists	Yes – Promising with 2-year data	Block GnRH receptors	Rapid symptom control, reversible	Symptoms resume after discontinuation, cost concerns
Danazol	Mixed – Some efficacy	Steroid hormone suppression	Reduces bleeding and size	Significant side effects, inconsistent outcomes
Aromatase inhibitors	Mixed – Limited use	Reduce estrogen synthesis	Shrink fibroids	Side effects, limited evidence
Collagenase injection	Mixed – Early trials	Enzymatic breakdown of fibroid collagen	Safe, reduces collagen content	Optimal dosing unknown
Thermal ablation (IR techniques)	Mixed – Emerging field	Heat-based destruction of fibroid tissue	Minimally invasive	Limited long-term data
Mirabilis system	Mixed – Early safety data	Noninvasive ultrasound ablation	Rapid outpatient treatment	Limited research
Vitamin D supplementation	Mixed – Some evidence	Hormonal modulation	May reduce fibroid development	More research needed
Acupuncture + mifepristone	Mixed – Limited studies	Neuroendocrine modulation	Further reduces fibroid volume	Limited evidence base
Guizhi Fuling + mifepristone	Mixed – Traditional medicine	Herbal and hormonal synergy	Reduces bleeding and subfertility	Requires more validation
Lifestyle changes	Mixed – Preventive potential	Hormonal and metabolic regulation	May prevent fibroid development	No guaranteed prevention

Abbreviations: COC, combined oral contraceptive; GnRH, gonadotropin-releasing hormone; Guizhi Fuling, Chinese herbal medicine; HIFU, high-intensity–focused ultrasound; IR, interventional radiology; MRI, magnetic resonance imaging; SPRM, selective progesterone receptor modulator; UAE, uterine artery embolization

managing endometriosis, and SERMs may even worsen pain outcomes compared to placebo.[66]

Emerging Therapies

Emerging treatments are looking at utilizing targeted nanoparticles for site-specific drug delivery and imaging in animal models.[67]

There are no primary prevention strategies but early identification and treatment may reduce progression and severity.[52] Guidelines encourage earlier diagnostic workup and psychosocial support to mitigate long-term impact.[51,52] Future directions should include stigma reduction, provider education, mental-health integration, and public awareness to reduce diagnostic delay.[51]

Osteopathic Considerations

Although medical and surgical treatments remain the mainstay for uterine fibroids, endometriosis, and PCOS, osteopathic physicians can offer a unique perspective in managing the musculoskeletal and autonomic

contributions to pelvic health. OMT may help alleviate pelvic congestion, modulate autonomic tone, and reduce somatic dysfunction contributing to pelvic and menstrual pain. Specific techniques include high-velocity low-amplitude (HVLA), myofascial release (MFR), counterstrain (CS), soft tissue (ST), muscle energy (ME), balanced ligamentous tension (BLT), sacral inhibition, lymphatic pump, pelvic floor release, and rib raising.[68]

Evidence suggests OMT can improve quality of life and reduce chronic pelvic pain through effects on myofascial tension and lymphatic circulation.[68,69] While direct research on OMT for fibroids is limited, its circulatory and neuroendocrine effects suggest a potential role in managing pelvic pain and menstrual irregularities that often accompany fibroids, endometriosis, or PCOS. BLT, MFR, and osteopathy in the cranial field have shown promising symptomatic relief.[69]

Additionally, a retrospective study found OMT significantly reduced pelvic pain and dyspareunia in postsurgical endometriosis patients, by implementing MFR, BLT, and indirect fluidic technique.[70] Physiotherapy (restoration of the balance of the autonomic nervous system) for PCOS improved fertility outcomes by enhancing pelvic blood flow and hormonal regulation.[71] Broader osteopathic literature highlights the value of manual therapies in addressing pelvic somatic dysfunctions, which may indirectly benefit women with fibroid-related pain or reproductive challenges.[68,69,72] Integrating osteopathic principles, including attention to visceral-somatic connections and patient-centered patient care, aligns with modern multidisciplinary approaches to gynecologic conditions and offers avenues for further research.

DISCUSSION

This review demonstrates the critical role of osteopathic family physicians in the comprehensive management of PCOS, endometriosis, and uterine fibroids. While hormonal and surgical treatments remain central, integration of OMT may enhance symptom control, particularly for chronic pelvic pain and autonomic imbalance. The evidence, though limited, supports OMT's potential to improve quality of life through modulation of somatic dysfunction and pelvic circulation.

Given the prevalence of these conditions in primary care, further research is needed to evaluate OMT's clinical

TABLE 3: Management for endometriosis.

Treatment Option	Research Support	Mechanism/Proc edure	Benefits	Limitations
Laparoscopic excision/ ablation	Yes – Gold standard with consistent efficacy	Surgical removal or destruction of endometrial lesions	Improves pain and fertility in selected patients	Invasive; requires surgical expertise
Ultrasound-guided ethanol sclerotherapy	Yes – Effective for ovarian endometriomas with low recurrence	Injection of ethanol under ultrasound guidance	Preserves ovarian reserve; minimally invasive	Limited availability; specific to endometriomas
Pre-operative hormonal suppression	Mixed – May ease surgery but no long-term pain benefit	Hormonal therapy before surgery	Facilitates surgical procedure	No improvement in long-term pain outcomes
COCs	Yes – Widely used as first-line therapy	Suppress ovulation and stabilize endometrial tissue	Reduce pain and menstrual symptoms	Do not treat underlying lesions
Progestins	Yes – Effective for pain management	Suppress endometrial growth	Improve pain symptoms	Hormonal side effects; variable efficacy
NSAIDs	Yes – Commonly used for pain relief	Inhibit prostaglandin synthesis	Reduce inflammation and pain	Symptomatic relief only; no effect on disease progression
GnRH agonists	Yes – Effective for pain and lesion reduction	Suppress ovarian hormone production	Improve pain and reduce lesion size	Hypoestrogenic side effects; bone loss
GnRH agonists + add-back therapy	Yes – Well-established	Hormone suppression + low dose add-back estrogen/ progestin	Preserves bone density, reduces menopausal symptoms	Complex regimen, requires monitoring
Elagolix (GnRH antagonist)	Yes – FDA approved with strong evidence	Oral suppression of LH, FSH, estradiol, and progesterone	Improves dysmenorrhea, pelvic pain, and dyspareunia	Symptoms may return after discontinuation; cost considerations
Pentoxifylline	No – Insufficient evidence for efficacy	Immunomodulator	Potential pain and fertility benefits	Lack of supporting data
SERMs	No – May worsen pain; low-quality evidence	Selective estrogen receptor modulation	Theoretical benefit for pain	Worsened outcomes compared to placebo
Targeted nanoparticles	Mixed – Promising in animal models	Site-specific drug delivery and imaging	Potential for precision treatment	Experimental; not yet in clinical use
Early identification and support	Yes – Recommended by guidelines	Timely diagnosis and psychosocial care	Reduces progression and improves quality of life	Requires systemic changes and awareness

Abbreviations: COC, combined oral contraceptive; FSH, follicle-stimulating hormone; GnRH, gonadotropin-releasing hormone; LH, luteinizing hormone; NSAID, nonsteroidal anti-inflammatory drug; SERM, selective estrogen receptor modulator

TABLE 4: Osteopathic interventions for common gynecologic disorders.

Condition	Treatment Option	Focus	Reported Benefit
Endometriosis	MFR, BLT, and indirect fluidic technique	Myofascial tension, lymphatic circulation, somatic dysfunctions of hip/pelvis region	Relief of pelvic tension and pain; reduced recurrent pain and dyspareunia after surgery
PCOS	Physiotherapy (pelvic-focused), general OMT (pelvic alignment and mobility support)	Autonomics, circulatory, endocrine	Improved infertility outcomes, hormonal balance, and pelvic circulation; benefit in promoting endocrine balance and reducing pelvic congestion
Uterine fibroids	General OMT (pelvic alignment and mobility support)	Circulatory, neuroendocrine, somatic dysfunctions of hip/pelvis region	No direct evidence, but may relieve associated pelvic pain and dysfunction
General (all three)	HVLA, MFR, CS, ST, ME, BLT, sacral inhibition, lymphatic pump, pelvic floor release, rib raising, cranial osteopathy	Myofascial tension, lymphatic circulation, somatic dysfunctions of hip/pelvis region, autonomics	May uncover overlooked contributors to pelvic pain (eg, in vulvodynia) and visceral-somatic connections

Abbreviations: BLT, balanced ligamentous tension; CS, counterstrain; HVLA, high-velocity low-amplitude; ME, muscle energy; MFR, myofascial release; PCOS, polycystic ovary syndrome; ST, soft tissue

utility through well-designed condition-specific trials. Osteopathic physicians are well positioned to lead this work by leveraging holistic patient-centered approaches within a multidisciplinary framework. Strengthening the evidence base will help define OMT's role in gynecologic care and inform best practices in family medicine.

It is also important to note that there are various other common gynecologic disorders such as pelvic inflammatory disease, ovarian cysts, vaginal infections, gynecologic cancers, and sexual dysfunction,[73] but these were not included as part of this review.

CONCLUSION

This review illustrates the complex and evolving treatment landscape for PCOS, endometriosis, and uterine fibroids, emphasizing the wide range of available medical, surgical, and integrative options. From hormonal therapies and emerging pharmacologics to interventional procedures and nutritional or herbal adjuncts, management must be tailored to patient goals and symptom profiles. Within this context, osteopathic family physicians are uniquely positioned to integrate OMT with evidence-based conventional and alternative therapies. By addressing somatic dysfunction, autonomic imbalance, and lifestyle factors, OMT may serve as a valuable adjunct in improving outcomes and advancing holistic patient-centered gynecologic care.

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