

REVIEW ARTICLE

OSTEOPATHIC MANIPULATIVE TREATMENT OF CHRONIC PELVIC PAIN DUE TO HIGH-TONE PELVIC FLOOR DYSFUNCTION

Morgan E. Barnett, DO, PGY-1¹; Kyle K. Henderson, PhD^{2,4}; Teresa L. Elliott-Burke, DPT³; Kurt P. Heinking, DO, FAAO⁴

¹Department of Psychiatry and Behavioral Medicine, Medical College of Wisconsin Affiliated Hospitals, Milwaukee, WI

²College of Graduate Studies, Midwestern University, Downers Grove, IL

³College of Health Sciences, Midwestern University, Downers Grove, IL

⁴Chicago College of Osteopathic Medicine, Midwestern University, Downers Grove, IL

KEYWORDS

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ABSTRACT

Context: Chronic pelvic pain syndrome (CPPS) is a complex pain syndrome that affects 15%–30% of people of childbearing age (~10–20 million, US).¹ Etiologies range from musculoskeletal conditions and visceral disease to neurological and psychological disorders. The interplay of many systems and disorders can manifest into a complex pathophysiology that is difficult to diagnose and treat. Dysfunction of the musculoskeletal system is often involved in patients with CPPS, either as the cause of pain or the result of underlying disease or dysfunction. Hypertonicity of pelvic floor muscles, myofascial trigger points, and dysfunctional shortening of the levator ani group of muscles contribute to the structural and functional abnormalities involved in CPPS.² Osteopathic physicians are in a unique position to directly address this somatic dysfunction with a nonpharmacologic, nonsurgical approach: osteopathic manipulative treatment (OMT).

Objectives: The purpose of this article is to review the literature on manual treatment efficacy for high-tone pelvic floor dysfunction (HTPFD) and the standardization of diagnosis to provide rational, medically based treatments. The second purpose is to elucidate the steps that the medical, and specifically the osteopathic profession can take to standardize pelvic floor evaluation, diagnosis, and treatment in the primary care setting.

Methods: A search was conducted on the US National Library of Medicine's PubMed database for studies involving manual therapy treatment for HTPFD. The authors excluded studies that described manual therapy interventions aimed at increasing pelvic floor muscle tone in patients with urinary incontinence and/or pelvic organ prolapse.

Results: For perspective, the initial search using the keywords "chronic pelvic pain syndrome" led to 2,281 publications since 1974; the addition of "osteopathic" led to 10 results since 2009. The search for "high-tone pelvic floor dysfunction" led to 30 publications since 1992; the addition of "osteopathic" yielded no results. To evaluate the efficacy of manual therapy for HTPFD, the search was expanded to include any manual therapy protocols. While the consensus in the literature is that manual treatment for chronic pelvic pain (CPP) is efficacious, the finding is limited by the lack of a comprehensive protocol to appropriately diagnose and treat the patient. The authors propose a system to standardize the assessment of a patient with CPP in the primary care setting by an appropriately trained physician so that pelvic floor dysfunction is recognized, properly diagnosed and treated, or referred to specialized care.

Conclusion: The literature supports that manual therapy is an effective treatment for CPP, and as primary care providers, osteopathic physicians are uniquely placed to recognize and treat patients with HTPFD, providing an empathetic, patient-centered approach. Standardization of the diagnosis and manual treatment of HTPFD is required to assess and monitor patients systematically. Development of an advanced training program for clinicians to learn diagnostic approaches and OMT for the pelvic floor should be required since the techniques addressing the pelvic floor musculature are often not included in traditional training.

INTRODUCTION

Chronic pelvic pain (CPP) disproportionately affects those capable of pregnancy, accounting for 10% of gynecologic consultations, and it is estimated that 30%–70% of cases involve a somatic component.¹ Chronic pelvic pain syndrome (CPPS) is a multifactorial pain disorder that localizes to the pelvic area and persists for longer than 6 months. Structural and functional abnormalities involved in CPPS include hypertonicity of pelvic floor muscles, trigger points in the vulvar area, and shortening of the levator ani group of muscles that comprise the deep pelvic floor.² Chronic pelvic pain syndrome is characterized by a dysfunctional pain system and psychological distress. Patients with CPPS are evaluated and treated by multiple specialties, spanning from primary care to subspecialty care. High-tone pelvic floor dysfunction (HTPFDF) is a common cause of CPPS and has been described in colorectal and osteopathic publications as coccygodynia, tension myalgia of the pelvic floor, and levator ani syndrome.^{3,4} High-tone pelvic floor dysfunction may also cause poorly localized pain in the perivaginal, perirectal, lower abdominal, pelvic, suprapubic, coccygeal, or posterior thigh regions. In addition to pain, it may cause vulvar and clitoral burning, dyspareunia, and voiding difficulties.⁵ Journals in urology have found HTPFD implicated in interstitial cystitis/painful bladder syndrome.⁶ Gynecologic literature is beginning to recognize the role of the musculoskeletal system in patients with dyspareunia,⁷ notably vulvodynia and vaginismus. Due to this, pelvic floor physical therapy is recognized as a first-line, conservative treatment option for pelvic floor disorders instead of surgical or hormonal treatment.⁸

The interplay of musculoskeletal, neurological, and psychological components in CPPS contributes to a patient's perception of pain. A differential diagnosis should consider the interplay of gynecologic, urologic, gastroenterological, neurologic, musculoskeletal, and psychological etiologies. To address musculoskeletal components of CPP, patients should receive a musculoskeletal assessment. This includes an external assessment of the abdomen, lumbar spine, sacrum, and pelvis and a complete pelvic exam, including the pelvic floor, to determine the presence of somatic dysfunction. Somatic dysfunction is defined as impaired or altered function of related components of the somatic (body framework) system: skeletal, arthrodiagonal, and myofascial structures and their related vascular, lymphatic, and neural elements.⁹ Once somatic dysfunction is diagnosed, osteopathic physicians are in a unique position to directly address high-tone pelvic floor somatic dysfunction with a nonpharmacologic, nonsurgical approach: osteopathic manipulative treatment (OMT). Osteopathic manipulative treatment (performed by the osteopathic physician) and manual therapy (performed by the physical therapist) are very similar modalities and are indicated to treat somatic dysfunction. Together, they will be referred to as

manual treatment. The purpose of this paper is to summarize the literature on manual treatment efficacy for HTPFD and elucidate the steps the osteopathic profession can take to standardize pelvic floor evaluation, diagnosis, and treatment in the primary care setting.

LITERATURE SEARCH METHODS

A search was conducted on the US National Library of Medicine's PubMed database for studies involving manual treatment for HTPFD using the keywords: high-tone pelvic floor, nonrelaxing pelvic dysfunction, chronic pelvic pain, chronic pelvic pain syndrome, pelvic floor physical therapy, pelvic floor manual therapy, myofascial physical therapy, osteopathic manipulative therapy, OMT, osteopathic, and osteopathic manipulative medicine. We reviewed each publication for its relevance to HTPFD, methodology, and scope. The authors excluded studies on CPPS that focused on increasing pelvic floor muscle tone in patients with urinary incontinence and/or pelvic organ prolapse.

Literature search results:

Research on pelvic floor dysfunction is complex because many conditions are implicated, including urinary, psychiatric, gastrointestinal, neurologic, and musculoskeletal etiologies. Only in the last decade has research consistently distinguished between different types of pelvic pain (nociceptive versus neuropathic), and characterization of muscle tone (high- vs low-tone). Existing research on the efficacy of manual treatment on HTPFD was largely composed of pilot studies, trials with small population sizes, and a handful of randomized controlled trials (Table 1). Similarly, a recent systematic review on physical therapy for pelvic floor hypertonicity since the year 2000 identified four randomized clinical trials, five prospective studies, and one case study.¹⁰ Overall, studies demonstrate manual treatment efficacy.^{2,6,11–14} The absence of OMT studies highlights the need for the osteopathic profession to standardize evaluation, diagnosis, and treatment of somatic dysfunction in the pelvic floor musculature.

Musculoskeletal structural examination findings:

Tu et al investigated the frequency of positive musculoskeletal exam findings, including abnormalities in pelvic, abdominal, back, and lower extremity examination, between 19 women with CPP and 20 healthy controls.¹⁵ The study demonstrated that patients with CPP were more likely to have iliac crest height asymmetry, positive posterior pelvic provocation (SI compression), pubic symphysis height asymmetry, dysfunctional tone, and higher pelvic floor tenderness. It is unclear whether pelvic asymmetry contributes to pain syndromes through kinetic chain disruption in the pelvis, back, and abdomen, or if anatomic changes in the region develop because of pain and guarding.⁴

Pathophysiology of HTPFD:

Resting hypertonicity can result from voluntary or involuntary holding, injury to the pelvic floor or pelvis from physical or orthopedic trauma, visceral pain syndromes (irritable bowel syndrome, endometriosis, interstitial cystitis),¹⁶ chronic stress,

CORRESPONDENCE:

Morgan E. Barnett, DO, PGY-1 | mbarnett@mcw.edu

surgery, or history of psychological or sexual trauma.^{15,17} Pelvic organs are connected functionally through shared common neural pathways, not just by anatomic proximity. The concept of visceral convergence is important in the evaluation of pelvic pain; with significant overlap of sensory fibers and visceral afferents in the pelvis, pain may be broadly referred to the abdominal wall.⁵ Due to this convergence, bowel and bladder symptoms often accompany gynecological symptoms such as dysmenorrhea and vulvodynia.^{18,19} Continual pelvic guarding is a suggested etiology of interstitial cystitis/painful bladder syndrome and vulvodynia.¹² Persistent contraction results in the activation of muscle afferent C-fibers and eventual release of substance P centrally and peripherally, leading to neuronal hyperexcitability. Relative ischemia of the muscle also contributes to the pathophysiological process.²⁰ Through these pathophysiological mechanisms, high-tone dysfunction of the pelvic muscles and CPP can be seen in patients with endometriosis, sequelae of pelvic inflammatory disease, ovarian cysts, pelvic vascular congestion, myofascial pain syndrome, irritable bowel syndrome, interstitial cystitis, nephrolithiasis, primary dysmenorrhea, postural alterations, musculoskeletal diseases, and somatic dysfunction.^{18,19}

Evaluation and diagnosis for HTPFD patients:

Under appropriate clinical conditions, with sensitive exam precautions and informed patient consent, a properly trained physician should complete a standardized assessment of the pelvic floor musculature to obtain an accurate diagnosis of HTPFD, and in doing so, identify cases that may be amenable to manual treatments. Accurate and specific diagnoses of somatic dysfunction allow physicians to tailor treatment to each patient and give the provider specific areas to reassess to determine the patient's response to manual treatment. Because of the anatomic location and invasiveness of the manual technique procedures, patient trust in their physician and consent to treatment are of paramount importance. It is essential for clinicians to provide clear instructions on how long each treatment takes, the number of treatments proposed, and any postprocedure instructions. Outcome measures (analog pain scale, lower urinary tract symptoms, pelvic pain index) should be used to gauge if treatments are beneficial and guide the clinical treatment plan. Clinicians treating this condition should have the prerequisite knowledge in pelvic anatomy and physiology, genitourinary and gynecological conditions, diagnostic methods, behavioral considerations, and manual, surgical, and pharmacologic treatment approaches. Enhanced training and standardization among therapists, physicians, and other clinicians can improve the quality of care, reduce patient anxiety, and decrease clinician liability. The following information on the musculoskeletal system, the pelvic floor, and psychosocial factors may help obtain a specific diagnosis of HTPFD in CPPS patients.

External pelvic examination recommendations:

Restriction of motion in the pelvic girdle may have a profound effect on the pelvic floor musculature and cause or contribute to complaints of abdominal pain, pelvic pain, dysmenorrhea, and lower back pain. In each scenario, the sacrum and the pelvis should be examined and treated for associated somatic

dysfunction. There is an integrated function between the muscles of the gluteal region, the abdominal diaphragm, and the pelvic floor musculature.⁴ A relaxed pelvic diaphragm is necessary for efficient movement of lymphatic fluids away from the pelvis and perineal tissues. Somatic dysfunction of the symphysis pubis and asymmetric position of the ilium can place asymmetric tensions on the pelvic floor musculature. Tension on the pubovesical fascia from innominate dysfunction may produce urinary tract symptoms such as burning, frequency, fullness, and a weak stream. Pregnancy can contribute to asymmetric alignment of the pelvic floor due to a shift in center of gravity and increased lumbar lordosis, which may lead to an anterior rotation or obliquity of the pelvic structures. Examination of the sacrum is also important, as sacral pain and pressure from uterine contractions can affect iliosacral mechanics. Iliosacral somatic dysfunctions are characterized by a positive standing flexion test with a negative seated flexion test and asymmetry between anatomic landmarks: pubic symphysis, anterior superior iliac spines, posterior superior iliac spines, and medial malleoli.²¹ Somatic dysfunction of the pubic symphysis is common and often overlooked. Pubic symphysis shears have been attributed to producing symptoms that mimic those of cystitis. The external examination of the sacrum includes finding a negative standing flexion test with a positive seated flexion test and includes assessing anatomical landmarks such as the sacral sulcus, inferior lateral angles, and L5 for asymmetries.²¹

Pelvic floor examination recommendations:

Before manual treatment of the pelvic floor, current recommendations include an external and internal examination.⁸ Patients with HTPFD exhibit tender pelvic floor musculature and impaired function. A systematic review by Meister et al found 55 studies that assessed pelvic floor myofascial pain in women and evaluated their physical examination methods. Overall, they found that methods varied significantly between studies and were frequently undefined, but based on the consensus in the literature, they outlined a recommended examination sequence. They provide a detailed recommendation for the structure of a physical examination of myofascial pelvic pain.²² A detailed guide on pelvic floor assessment was recently published by Harm-Ernandes et al.²³ Both incorporate a clock-face method to localize palpation to specific musculature.^{24,25} Briefly, the physician should palpate the superficial and deep pelvic floor muscles and obturator internus for tenderness (rating tenderness on a 1–10 scale) using a single digit at a single site in the middle of the muscle belly. Following treatment, reassessment should include another evaluation of these parameters for improvement. Few providers assess for pelvic floor myofascial tenderness using an internal examination due to lack of specific training. A standardized and reproducible physical exam for evaluating patients with CPPS would ensure that all patients are thoroughly examined, accurately diagnosed, and appropriately treated.

Evaluation of psychological factors contributing to pain:

The experience of pain in patients with chronic pain syndromes is frequently complicated by somatization and catastrophizing. Pain type, quality, and intensity can reveal pathophysiological

mechanisms that underlie patient symptoms. Physicians need to quantify a patient's pain to fully address all facets of the clinical presentation. Passavanti et al demonstrated the utility of specific pain questionnaires for patients with CPPS.²⁶ In summary, they highlight the utility of questionnaires in four key areas: (1) Multidimensional pain: To assess the relevant features of pain and its effect on quality of life for patients with chronic pain (MPQ or SF-MPQ). (2) Neuropathic pain: To distinguish from nociceptive pain, use the New Neuropathic Pain Diagnostic Questionnaire (DN4). (3) CPPS-specific: Used for CPP evaluation (Pelvic Pain Assessment Form) and additional utility for diagnostic and therapeutic purposes (UPOINT). A physician may consider using a symptom index, such as the Interstitial Cystitis and Problem Index scores (ICSI/ICPI-the O'Leary-Sant symptom index) to monitor treatment efficacy. The specific questionnaire will vary depending on formal diagnosis. (4) Psychological: To reveal the complexity of a patient's pain for psychological comorbidities, Grinberg et al tracked changes in a battery of psychological tests before and after myofascial physical therapy and found improvements after therapy in the State-Trait Anxiety Inventory, the Brief Symptom Inventory, the Pain Catastrophizing Scale, and the Beck Depression Inventory.² Depending on each individual patient, further psychological screening may be warranted, including screening for depression, generalized anxiety disorder, or post-traumatic stress disorder.

Osteopathic manipulative treatment for HTPFD:

During the external and internal physical examination, if the clinician finds the tissues of the pelvic region to have (1) asymmetry, (2) motion restriction, (3) tissue texture changes, and (4) local tenderness, a diagnosis of somatic dysfunction of the pelvis is made. Before treating this somatic dysfunction with osteopathic manipulative treatment, informed consent is obtained and clinicians need to consider the indications and contraindications. Although the indications to perform OMT are variable, the following four criteria, coupled with lower urinary tract symptoms (dysuria, frequency, urgency, dyspareunia, etc.) or pain in the lower abdomen, pelvic girdle, sacrum, hip, groin, or leg, provide the indication to proceed with OMT.²⁷ Contraindications to osteopathic treatment of the patient with HTPFD follow the usual contraindications for adults with female anatomy. Absolute contraindications include a surgical emergency, undiagnosed bleeding, or inability to consent for any reason. Relative contraindications include patients with diseases causing bone fragility who should not be treated with high-velocity, low-amplitude, or forceful techniques. Local invasive cancer due to the risk of tumor seeding and very ill patients should only be treated for brief periods.⁵ Contraindications for the pregnant patient should also include undiagnosed vaginal bleeding, threatened or incomplete abortion, ectopic pregnancy, placenta previa, placental abruption preterm, premature rupture of membranes, preterm labor, prolapsed umbilical cord, eclampsia, and surgical or medical emergencies.⁵

The pelvic diaphragm can be treated with direct or indirect myofascial release, inhibitory pressure, and counterstrain. Myofascial release can be done with an external approach to address the pelvic floor. However, the pelvic floor may also be

evaluated and treated with an internal approach, either vaginally or rectally. When preparing to do internal treatments with counterstrain for the pelvic floor, the patient is usually examined in the dorsal lithotomy position. A tenderpoint is identified with a gloved finger on the perineum, or in the vagina, contacting the muscular layer. As the tenderpoint is monitored with one finger, the clinician may induce flexion or extension of the hip by moving the leg toward or away from the patient. Rotation of the hip and pelvis can also be employed using the clinician's free hand. The counterstrain position is held for 90 seconds while monitoring until the tissue tension and tenderness abates.⁵

For somatic dysfunction found on the internal examination of the pelvic floor muscles, OMT may be indicated.²⁸ Patients with CPP often have palpable tender areas or "trigger points" in their pelvic floor musculature. Travell and Simons identified trigger points in the muscles of the pelvic floor that may be amenable to inhibitory pressure, counterstrain principles, or myofascial techniques using vaginal palpating digits.⁴ When somatic dysfunction of the cardinal, uterosacral, and round ligaments is found, myofascial techniques, counterstrain, and balanced ligamentous tension, may be used to normalize the ligament tensions and restore the cervix to its normal midline position.⁵ Manual treatments provide a well-tolerated, noninvasive treatment method that can be quite beneficial for patients.

Proposed history and physical exam for chronic pelvic pain:

Based on the information from this narrative review, the authors propose the following flow chart to help standardize the diagnosis of CPP (Figure 1). This flow chart outlines the components of a thorough patient history (including features of presentation, past medical history, and questionnaires for pain and psychological comorbidities) and a focused physical exam (including recommendations for a GI/GU exam, external and internal musculoskeletal exams, and a neurologic exam). Use of a systematic and standardized approach to the musculoskeletal exam will allow physicians to improve diagnosis and determine efficacy of treatments.

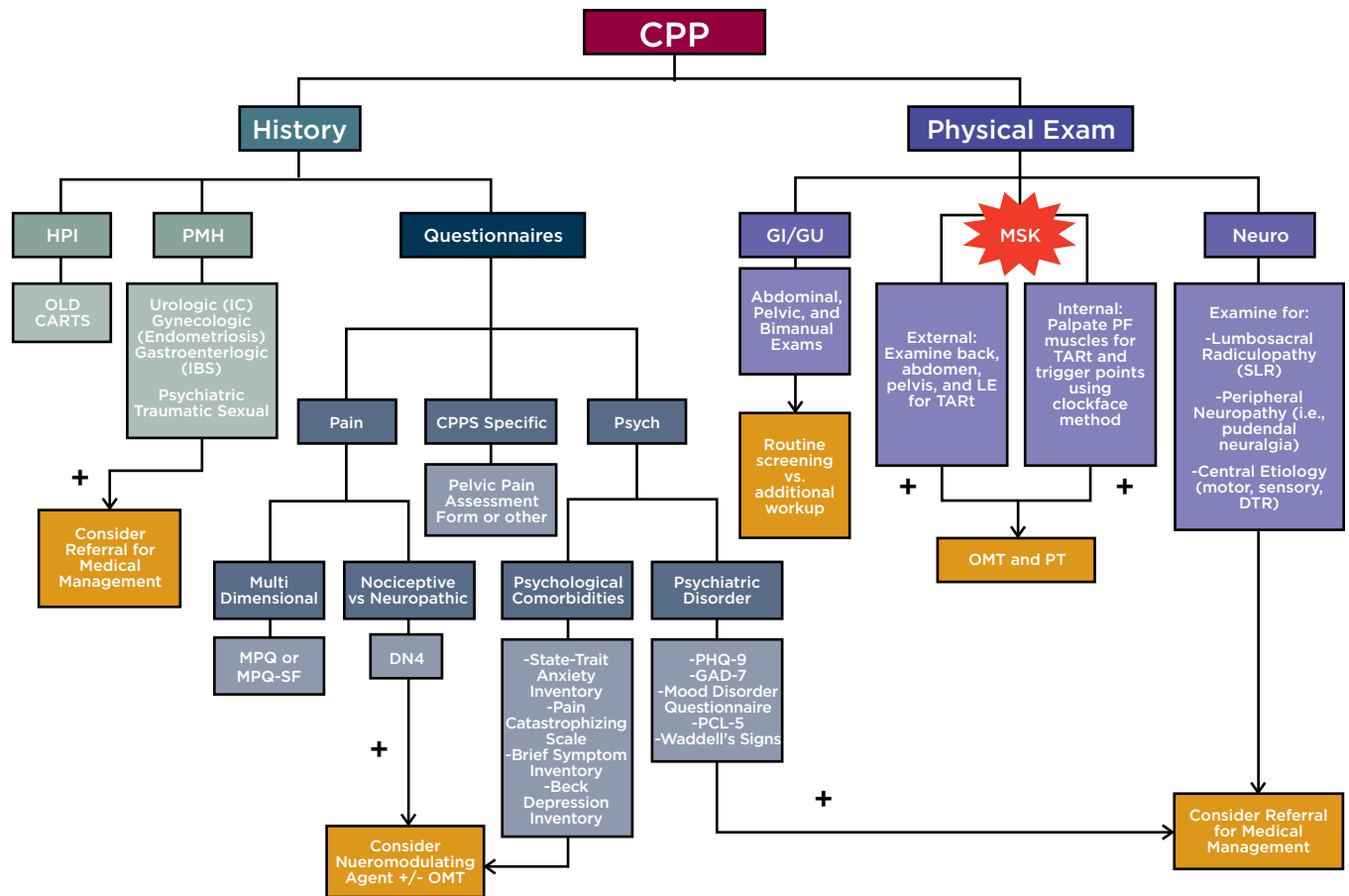


FIGURE 1: Standardizing the diagnosis of chronic pelvic pain flow chart.

SUMMARY

CPPS is a complex syndrome involving structural and functional abnormalities of pelvic floor muscles, a dysfunctional pain system, and psychological components that requires a multifaceted, interdisciplinary team treatment approach. Creation and sustainability of a multidisciplinary clinic that treats patients with HTPFD is feasible.²⁹ Standardization of the diagnosis of HTPFD is required to assess and monitor patients systematically. The creation of an advanced training program for clinicians to learn diagnostic approaches and OMT for the pelvic floor would be beneficial since techniques addressing the pelvic floor musculature are often not included in traditional allopathic/osteopathic training. An advanced training program would instruct clinicians in patient selection, communication, patient safety, and proper diagnostic and manipulative treatment methods. While a neuromusculoskeletal medicine fellowship opportunity for osteopathic physicians provides more focused training in OMM, the profession may also benefit from looking to the precedent set by American Physical Therapy Association. National physical therapy organizations provide additional specific curriculum for physical therapists that provide manual treatments to this sensitive region.

CONCLUSION

Overall, manual treatment is an effective approach for CPP. For patients who respond to manual treatment and require more frequent appointments, a course of physical therapy combined with OMT may be beneficial. Since underlying trauma may be involved in this patient population,¹⁷ effective treatment relies on a strong patient-physician relationship, particularly one founded on good communication, trust, consent, and patient empowerment. Doctors of osteopathic medicine are uniquely placed as primary care providers to recognize and treat patients with HTPFD, providing an empathetic, patient-centered approach that considers the unique factors contributing to a patient's pathophysiology and addressing the interrelated musculoskeletal, neurological, and psychological components of the disease process. Working together in an interprofessional and complimentary way, DOs and PTs can offer hope to patients with CPPS to overcome their condition and lead a more comfortable and functional life.

TABLE 1:

Studies evaluating efficacy of manual therapy for high-tone pelvic floor dysfunction or HTPFD-associated condition

STUDY	n	TREATMENT	STUDY DESIGN	OUTCOME MEASURE	RESULTS/LIMITATIONS	YEAR
Lukban et al. ⁶	16	Manual PT	Pilot	Modified Oswestry Score, ICSI	4% improvement in irritative bladder symptoms and dyspareunia	2001
Oyama et al. ¹¹	13	Modified Thiele massage: 2x/week x 5 weeks	Pilot	ICSI, ICPI, Likert Visual Analog for pain and urgency, Physical Component Summary, Mental Component Summary, Modified Oxford Scale	Statistically significant improvements in all outcome measures after protocol completion; results remained statistically significant at long-term follow-up in all measures except for Physical and Mental Component Summaries; Uncontrolled	2004
Fitzgerald et al. ¹²	81	Myofascial PT vs. Global therapeutic massage (GTM): up to 10 treatments over 12 weeks	Randomized clinical trial	7-Point Global Response Assessment	26% improvement in GTM and 59% improvement in MPT	2012
Bedaiwy et al. ¹³	146	PT	Retrospective chart review	Pain scores	Pain rating improvement from 9 (median) at start, to 5 midtreatment, to 2.5 at final treatment	2013
Grinberg et al. ²	39	Myofascial PT (8 weekly sessions) vs. nontreated group	Prospective, longitudinal, cohort	Morphologic parameters, pain system functioning, psychological changes	MPT has anatomical, neurophysiological, and psychological therapeutic effects, in addition to long-lasting pelvic pain alleviation	2019
Schvartzman et al. ¹⁴	42	Pelvic floor muscle training (PFMT) group vs. lower back (LB) group	Randomized clinical trial	Pain scores (dyspareunia) using 10-Point Visual Analog Scale	Mean pain scores in the PFMT group decreased from 7.77 ± 0.38 to 2.25 ± 0.30 and in the LB group from 7.62 ± 0.29 to 5.58 ± 0.49	2019

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