

Ragi Doggweiler-Wiygul · J. Philip Wiygul

## Interstitial cystitis, pelvic pain, and the relationship to myofascial pain and dysfunction: a report on four patients

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**Abstract** Treatment of chronic pelvic pain (CPP), interstitial cystitis (IC), prostatodynia, and irritative voiding symptoms can be frustrating for both patients and physicians. The usual approaches do not always produce the desired results. We found that when we treated myofascial trigger points (TrP) in pelvic floor muscles as well as the gluteus, piriform, infraspinatus, and supraspinatus muscles, symptoms improved or resolved. Various palpation techniques were used to isolate active myofascial TrPs in these muscles of four patients with severe CPP, IC, and irritative voiding symptoms. Injection and stretch techniques for these muscles were performed. Visual twitch responses at the skin surface and in the muscles were used to verify successful needle piercing of a TrP. The patients were asked to verbally describe exactly where the flash of distant pain was felt, a process that permitted an accurate recording of the precise pattern of pain referred by that TrP. The findings involved with the four patients substantiate the need for myofascial evaluation prior to considering more invasive treatments for IC, CPP, and irritative voiding symptoms. Referred pain and motor activity to the pelvic floor muscles (sphincters), as well as to the pelvic organs, can be the sole cause of IC, CPP, and irritative voiding dysfunction and certainly needs further investigation.

**Keywords** Myofascial pain · Trigger point · Interstitial cystitis · Referred pain · Chronic pelvic pain

Treatment of chronic pelvic pain (CPP), interstitial cystitis (IC), prostatodynia, and irritative voiding symptoms can be frustrating for both patients and physicians [4]. The usual approaches do not always produce the desired results. We found that when we treated myofascial trigger points (TrP) in the pelvic floor muscles as well as the gluteus, piriform, rectus, paraspinatus, infraspinatus, and supraspinatus muscles, symptoms improved or resolved.

Clinical studies on large numbers of patients show that chronic painful states of obscure causes often depend on feedback cycles from myofascial TrPs and their pain reference zones [10]. Symptoms outlast precipitating events because of vicious cycle reflex patterns and continuing mechanical stresses on the affected somatic structures. Most tissues heal when injured, but skeletal muscles “learn”; they readily develop habits of guarding that limit movement; impair circulation; and result in chronic pain, weakness, stiffness, and dysfunction of muscles [11].

TrPs are hyperirritable bundles of fibers within a muscle that become “knotted” and inelastic and unable to contract or relax. The hallmarks upon physical examination are marked muscle tenderness, loss of range of motion, and muscle weakness. Myofascial treatment in the form of injection of local anesthetic and/or dry needling followed by a specific, supervised, therapeutic stretching program aims to reestablish a painless, full range of motion.

The active TrP is distinguished by referred pain and local twitching that can be elicited by mechanical stimulation such as palpation or needling [7]. Latent TrPs are clinically asymptomatic and do not cause referred pain during compression. A muscle with active or latent TrPs is characterized by weakness on active contraction without atrophy over long periods. Frequently there is a

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R. Doggweiler-Wiygul (✉)  
Department of Urology,  
University of Tennessee,  
1211 Union Ave., Stre 340,  
Memphis, TN 38104, USA  
E-mail: r\_wiygul@yahoo.com  
Tel.: +1-901-4481022  
Fax: +1-901-4481122

J.P. Wiygul  
Department of Orthodontics,  
Special appointment to the TMJ and  
Musculoskeletal Disorder Clinic,  
University of Tennessee,  
Memphis, TN, USA

reduced range of motion. A normal healthy muscle does not contain TrPs, is not tender to ordinary pressure, and does not cause pain react of the patient. Latent TrPs are easily activated by minor stresses, like periods of immobility, overstretching, overuse in repetitive movements, falls or accidents, and chilling [11].

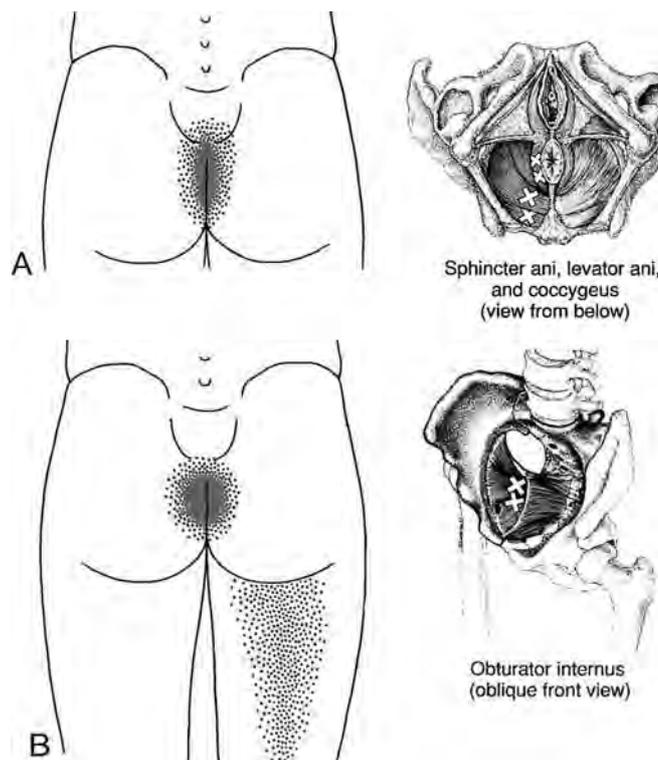
### Muscles referring pain to the pelvis

Pelvic floor muscles are composed of the bulbospongiosus, ischiocavernosus, transversus, sphincter ani, levator ani, coccygeus, and obturator internus (Fig. 1). TrPs in these muscles cause poorly localized pain symptoms called coccydynia, levator ani syndrome, or proctalgia fugax. These TrPs often refer pain toward the perineum, vagina, penile base and give a sensation of fullness in the rectum and an urgency to urinate. Sitting becomes very uncomfortable, as well as urination and defecation (Fig. 2).

Other muscles referring pain into the pelvis are the gluteus, piriformis, quadratus lumborum and thoracolumbarum paraspinal muscles. The gluteus muscles (mostly minimus, but even medium and maximus) are often involved in low back, hip, and inguinal pain [12].

TrPs in the piriformis muscle frequently contribute to myofascial pain syndromes in the pelvis and can cause pain in the lower back, groin, perineum, buttock, hip, posterior thigh, leg, foot and in the rectum during defecation. Often patients complain about sexual dysfunction, such as dyspareunia in females, and impotence in males [2].

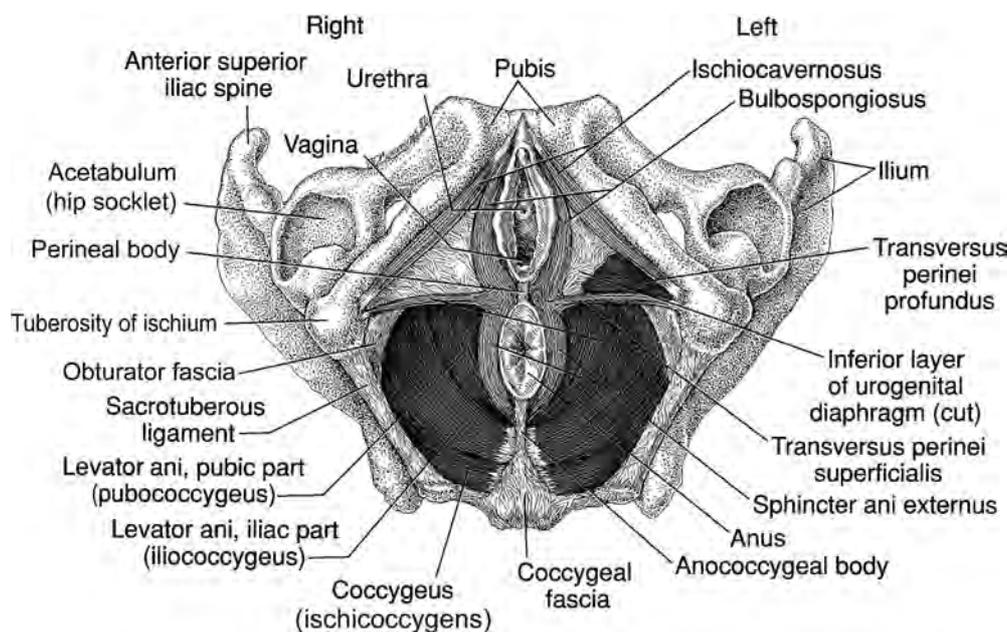
Pain referred from the quadratus lumborum is localized along the crest of the ilium and sometimes to the adjacent lower quadrant of the abdomen, to the outer upper aspect of the groin, to the greater trochanter and



**Fig. 2** Referred pain patterns (solid gray and gray stippling) generated by trigger points (Xs), **A** in the right sphincter ani levator, and coccygeus muscles; and **B** in the right obturator internus muscle [taken from Travel JG, Simons DG (1992) Myofascial pain and dysfunction, the trigger point manual, vol 2. p 112, Fig. 6.1]

outer aspect of the upper thigh, to the sacroiliac joint, or to the lower buttock [12]. Additional areas of pain referral from the quadratus lumborum have been reported in the anterior thigh, testicle, and scrotum [6].

**Fig. 1** Pelvic floor muscles as seen from below in supine female subject [taken from Travel JG, Simons DG (1992) Myofascial pain and dysfunction, the trigger point manual, vol 2. p 113, Fig. 6.2]



Thoracolumbar paraspinal muscles may refer pain to the abdomen and may be mistaken as visceral pain, lumbago, or sacral pain. The pain can resemble renal colic and can cause retraction of the testicle [8].

TrPs in the rectus abdominis may confuse diagnosis by mimicking visceral pathology. Often the pain is described as burning, fullness, or bloating [11]. TrPs in the lower part of the rectus abdominis may be responsible for dysmenorrhea and pain to the sacroiliac joint and lower back regions.

The supraspinatus and infraspinatus muscles refer pain toward the shoulder and upper extremities. In one of our reported patients, involvement of these muscles caused severe urethral pain.

Activation of TrPs can be due to a fall, automobile accident, or surgery in the pelvic region. But very often no injury can be identified. Sitting in a slumped or slouched posture for prolonged periods can also be responsible. Dysfunction of the sacroiliac joints and sacrococcygeal articulation may be aggravating sources of TrPs. Discrepancy in length of the legs of 0.5 cm and more can cause back pain and TrPs, as well as pelvic distortion. A head-forward kyphotic posture may perpetuate TrPs in gluteus muscles. Position at the work desk, sleeping patterns, shoes, and posture of the patient need to be evaluated [11].

Nutritional inadequacies can result in hyperirritable muscles and TrPs. Proper nutrition needs to be discussed with the patient if lasting relief from pain is to be achieved.

Psychological factors contribute to perpetuating myofascial TrPs. Physicians must be careful not to assume that psychological factors are primary. This wrong assumption can be – and often is – frightfully devastating to the patient [11]. Depression and chronic pain are closely associated, especially if patients are not finding understanding or relief from their symptoms.

Visceral diseases tend to increase activity of myofascial TrPs. Examples are herpes viruses, urinary tract infections, and sinusitis. Chronic allergies and impaired sleep can also make muscles more painful.

Diagnostic criteria include the presence of exquisite tenderness at a nodule in a palpable taut band. If a patient recognizes pain that is elicited by digital pressure or needle penetration of the TrP as the clinical pain complaint, the TrP is clinically active and not just latent.

### Trigger point treatment

Various palpation techniques were used to isolate active myofascial TrPs in the muscles of four patients. Physical evaluation included musculoskeletal and posture assessment and analysis of gate and active range of motion and strength. Overall muscle tone, tissue sensation location of tenderness and TrPs, and perineal movement were evaluated. Vaginal or rectal pelvic examination assessed tenderness, contraction, strength, and coordination of the pelvic floor muscles [13].

Therapy was based on dry needling and injection of active TrPs. Injection was with 0.5% procaine hydrochloride (procaine 2% diluted with normal saline to 0.5%) using a 25G 1–1/2-inch needle or dry needling with acupuncture needle 30G, 50 mm (Seirin). Procaine was used as it is the least myotoxic of the local anesthetics in common use [11]. A 25G 3–1/2-inch spinal needle was generally used to reach TrPs in the deepest muscles, such as gluteus minimus and quadratum lumborum. For all types of TrP therapy the goal is to restore normal resting muscle length and a full range of motion, achieved first by passive stretching and finally by active effort under a light load. Visual twitch responses at the skin surface and in the muscles are used to verify successful needle piercing of a TrP.

The TrP was identified by palpation as a spot of exquisite tenderness in the palpable band. As some patients are very afraid of the skin pain caused by needle penetration, a distracting stimulus by stretching or pinching the skin just as the needle is inserted may be helpful [11]. When the active TrP is contacted by the needle, the patient can usually describe the exact distribution of the referred pain. Therefore, the patient is warned that successful needle contact with a TrP may produce a flash of distant pain and may cause the muscle to twitch. Frequently, multiple TrPs are present in one region of a muscle. All tender spots in one region should be eliminated. After each probing movement, the needle must be withdrawn to subcutaneous tissue and redirected before the next movement. In each TrP, a very small amount (0.1 cc) of procaine 0.5% is injected. Dry needling is very helpful in a region that presents with several TrP, because there is less trauma caused by the smaller needle. Also the tactile sense is greater for the clinician.

Stretching following the TrP injection to increase muscle length is the most important part of the treatment. Relief is usually long lasting only if mechanical and systemic perpetuating factors are corrected [9]. Intra vaginal or intrarectal TrPs are treated with biofeedback, and physical therapy [3].

### Patient reports

All four patients were evaluated and treated in the Bladder Dysfunction and Pelvic Pain Center by RDW. Patient C was also treated by JPW for facial pain and temporomandibular joint dysfunction (TMJ).

Patient A was a 39-year-old female affected for more than 10 years by chronic pelvic pain, interstitial cystitis, and diffuse myofascial pain syndrome. She noted urgency and frequency every 15–30 min, as well as chronic constipation. She also had recurrent urinary tract infections since age 16 and underwent a hysterectomy and bladder suspension at age 26 secondary to endometriosis and urinary incontinence. She described her pain as achy, cramping pressure in the lower back, pelvic, and suprapubic areas. The pain was exacerbated

unpredictably; the only helpful relief was given by hot baths. On physical exam, she presented with TrPs in her gluteus minimus that referred pain into the pelvis and down the lateral and posterior aspects of the lower limbs. Upon palpation of the TrP in the piriform muscle, she felt exacerbation of her bladder pain. Examination of the rectus abdominis and paraspinal muscles referred pain toward her bladder. On the vaginal exam, she was unable to isolate her pelvic floor muscle for contraction or relaxation and presented severe tenderness of the pelvic floor muscles on the left side. When her rectus abdominis muscle was first injected, she noted severe pain in her bladder that was followed by immediate relief. In the prone position, the most tender spot in her paraspinal muscle was identified and injected, reproducing the bladder pain. Upon TrP injection into the gluteus minor and piriform muscles, she felt “an explosion in my pelvis and leg.” She was instructed how to perform stretching exercises for these muscles prior to leaving the office. She called later the same day to say that she had immediate improvement of her constipation. There hasn’t been a recurrence of the constipation in 6 months. She is continuing with her daily stretching exercises at home. In addition, she is very careful with her diet and tries to have balanced nutrition. She comes to the clinic monthly for examination and injection of TrPs as needed. Her quality of life has improved significantly.

Patient B was a 47-year-old female referred for interstitial cystitis and chronic pelvic pain. She had urgency and frequency every 30–60 min. She described her pain as achy pressure in the lower left abdomen that increased with lifting, walking, and climbing. She underwent a hysterectomy secondary to pain and 10 years later a bilateral oopho-salpingectomy. She underwent several different medical treatments (bladder instillations, hydrodistentions) without any relief from her pain. On physical exam, she had weak and tender pelvic floor muscles. Palpation of the TrPs in the piriform muscle on the left side triggered “paralyzing” pain in her pelvis. During the injection of the piriform muscle, she reported severe pain to the inguinal region, the suprapubic area ipsilaterally, laterally across the buttock, and over the hip region posterior followed by immediate relief. She stated: “My pain is gone.” She was taught stretching exercises, and proper nutrition was discussed. She reported upon follow-up the next day that her irritative voiding symptoms were dramatically improved from voiding every 15 min to once every 2–3 h. She came back for 3 consecutive months for reexamination and reinjection. She was taught pelvic floor exercises by the physical therapist and is continuing with a home program.

Patient C was a 52-year-old female referred for severe chronic pelvic pain and interstitial cystitis. She had urgency and frequency every 1 h, and she had irritable bowel syndrome. She described her pain as feeling like razor blades rotating in her urethra and pressure and burning in the suprapubic and vaginal areas. Hot baths

and stretching helped her pain. Her medical history was significant for a trauma to her knees at age 11 due to a fall which probably stressed her pelvic floor muscles. She underwent implant for sacral nerve stimulation, which improved her voiding symptoms, but the razor blade-like sensation in her urethra persisted. She was treated for TMJ pain. Injection of TrPs in her infraspinatus and supraspinatus muscles referred the sensation of “razor blades” in her urethra. Stretching of the injected muscles resulted in complete relief. She is now in a program with biofeedback and physical therapy.

Patient D was a 42-year-old-female referred for chronic pelvic pain and interstitial cystitis. She had urgency and frequency and described her pain as cramping and burning in the pelvic area and in the lower back. The pain worsened with standing, sitting, lifting, and riding in a car. Her medical history was significant for kidney stones and endometriosis. She underwent urethral dilations and hysterectomy followed by laparoscopy for adhesions and scar tissues. She stated that she underwent removal of a mass in her bladder. When she came to our clinic, a cystoscopy was negative. On physical examination, taught bands were found in her paraspinal muscles, as well as in her rectus abdominis muscle. On palpation she reported pain into her bladder. Compression of a TrP in her gluteus muscles reproduced pain toward her pelvis; the pelvic exam was difficult to perform because of this pain. She had severe tenderness on the levator muscles. Injection of the TrP in the paraspinal muscle referred pain toward her flank and leg while the injection of the rectus muscle referred pain toward her bladder and “through the whole pelvis.” Injections of the TrPs in the gluteus muscle were felt in the pelvis (in the bladder and vagina). She stated: “Yes, this goes right in my pain.” She was taught stretching exercises, started with physical therapy, and is trying to follow proper nutrition. She is coming to the clinic regularly to be reexamined. Her overall activity has improved and she is trying to continue the exercises regularly.

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## Conclusion

More than 50 years ago, Janet Travell [10] reported the phenomenon of referred pain and referred motor activity due to TrPs in skeletal muscles, now known as myofascial pain and dysfunction. These findings observed in our four patients substantiate the need for myofascial evaluation prior to considering more invasive treatments for IC, CPP, and irritative voiding symptoms. To evaluate myofascial pain it can be helpful in showing patients with severe CPP, IC, or irritative voiding symptoms pictures of referred pain patterns to localize the TrPs like in figure 2. Frequently patients point to one or more pictures stating, “this is my pain”. This approach may help physicians, as well as the patients, focus on underlining myofascial pain and dysfunction problems of these chronic pain syndromes.

The activation of a TrP is usually associated with some degree of mechanical abuse of the muscle in the form of overload, which may be acute, sustained, and/or repetitive. Leaving the muscle in a shortened position can convert a latent TrP to an active TrP, and this process is greatly aggravated if the muscle is contracted while in a shortened position. Often the patient is aware of pain caused by an active TrP but may or may not be aware of the underlying muscle dysfunction. The intensity and extent of the referred pain pattern depends on the degree of irritability of the TrP, not on the size of the muscle. Myofascial TrPs in small muscles can be as troublesome to the patient as TrPs in large muscles. Trigger-point injection has been shown to be one of the most effective treatment modalities to inactivate TrPs and provide prompt relief of symptoms [1]. If TrPs are found, treatment is directed toward their eradication, correcting underlying perpetuating factors, and restoring the normal relationships between the affected muscles [5].

This report must not be misconstrued as saying that CPP, IC, and voiding dysfunctions are always caused by myofascial TrPs. But the possibility of myofascial referred pain and dysfunction needs to be considered prior to planning more invasive approaches. Referred motor activity to the pelvic floor muscles (sphincters), as well as to the pelvic organs, due to TrPs can be the sole or concomitant cause of IC, CPP, prostatodynia, and irritative voiding dysfunction and certainly needs further investigation.

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