REVIEW ARTICLE

AN OSTEOPATHIC APPROACH TO URINARY INCONTINENCE INCLUDING BIOPSYCHOSOCIAL ASPECTS AND MULTIPLE MODALITIES FOR A HOLISTIC APPROACH TO OPTIMIZE ONGOING CARE

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KEYWORDS

Urinary incontinence

Self-image

Socialization

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ABSTRACT

Urinary incontinence is a nuanced and stigmatized condition that causes significant challenges for a large number of people in the United States and imposes a large financial and community burden. We provide an overview of major categorizations of incontinence by type as well as potential etiologies. We discuss how this condition impairs self-image, interferes with socialization, and can lead to depression and isolation; these elements inter-relate with access to care and implementation of the therapeutic options, further exacerbating patient suffering. We recognize the key components of patient evaluation regarding history and physical examination. Medicinal, surgical, and assistive device use are reviewed. Osteopathic manipulative treatments addressing the structures of the pelvis are also reviewed in detail. We illustrate how these techniques can be used to optimize outcomes. Utilizing a holistic approach to mitigate the multiple challenges that this condition presents can lead to greater success, reduced distress, and improved patient satisfaction.

INTRODUCTION

Osteopathic family physicians are often the first to evaluate urinary incontinence, which is common and affects both men and women. Urinary incontinence has a similar severity of impact on the quality of life as Alzheimer's disease, Parkinson's disease, and stroke. The prevalence is estimated to affect over 50% of adult women in the United States and 1% to 39% of men worldwide.[1,2] The impact of urinary incontinence is far reaching and additionally affects family, loved ones, and caregivers.[3] The direct and indirect costs of urinary incontinence in the United States have been estimated to be $25 billion for patients over 65 years.[4,5] The direct financial cost in the United States including diagnostic procedures, treatments, medications, devices, and personal products has been estimated to be over $16 billion per year. Indirect costs to consider include complications and disabilities, loss of productivity, reduced quality of life, as well as caregiving and nursing-home placement.[3,6,7] The emotional cost, however, is often overlooked and it is important to consider how it affects not only the patients, but also their families. Common etiologies of urinary incontinence include age-related changes, pregnancy and childbirth, obesity, neurologic conditions, and certain medications. This article will review current treatment options for the various forms of incontinence, including osteopathic manipulative treatment. It will also incorporate the emotional consequences of incontinence and discuss the importance of a holistic approach to best serve these patients.

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CATEGORIES OF URINARY INCONTINENCE

Urinary incontinence is typically categorized by pathophysiology and clinical presentation. The six most common types are stress, urge, reflex, overflow, functional, and mixed.

Stress urinary incontinence (SUI) is the leakage of urine during periods of increased intra-abdominal pressure such as standing up or lifting, coughing, sneezing, or laughing. It arises from mechanisms that cause structural insufficiency to the pelvic floor or the internal and/or external sphincters.[8-10] Etiologies for SUI include urethral hypermobility, intrinsic sphincter deficiency secondary to neurologic compromise (including postprostate surgery), lack of tissue bulk from estrogen deficiency, and medications.[11-19]

Urge urinary incontinence (UUI) is when the patient experiences the sensation of needing to void immediately followed by leakage of urine. It is related to external cues such as hearing the sound of running water or washing hands. It shares overlapping symptoms

with overactive bladder arising from insufficient relaxation and overactivity of the detrusor muscle leading to uninhibited bladder contractions.[20] Fascial strains inducing tension across the detrusor muscle magnify overactivity.[21,22] Etiologies for these include idiopathic neurologic disorders, bladder abnormalities, increased and altered bladder microbiome, medications that increase bladder contractility, or obstruction.[18,19,23-26]

Overflow incontinence results from incomplete bladder emptying, with symptoms of urinary leakage or dribbling, weak or intermittent urinary stream, hesitancy, frequency, and/or nocturia. This form of incontinence can be thought of as a cup that has been overfilled.

Urine retention can be caused by detrusor muscle underactivity or bladder outlet obstruction (BOO). Causes include impaired contractility from smooth muscle damage from acute severe or chronic sustained overdistention of the bladder or fibrosis.[27] Fibrosis also restricts bladder distension, resulting in maximal filling with low volume. Additional causes of impaired contractility include low estrogen state, peripheral neuropathy (due to diabetes mellitus, vitamin B12 deficiency, alcoholism), spinal cord damage, or spinal detrusor efferent nerve damage from conditions such as multiple sclerosis and spinal stenosis.[28-31] Causes of BOO include external compression of the urethra from fibroids, Fowler's syndrome (urethral sphincter relaxation disorder), advanced pelvic organ prolapse, overcorrection of the urethral tract from prior pelvic floor surgery, regional scar formation, benign prostatic hypertrophy (BPH), constipation, and medications.

Reflex incontinence is the disruption of the neurologic pathways involved in controlling the bladder.[32,33] Afferent signals from the bladder sent through the pelvic nerve activate spinobulboreflex pathways that ascend to the brain.[34,35] Cortical efferent signals pass through the pontine micturition center (PMC) and stimulate sacral parasympathetic outflow to the bladder activating the detrusor and then inhibiting sympathetic urethral sphincter contraction.[36] Neuronal damage from multiple sclerosis, stroke, or Parkinson's disease removes cortical inhibition resulting in detrusor overactivity and decreased bladder filling.[37,38] Patients with spinal cord injuries proximal to the sacral segments also lose connections for voluntary voiding, but over time, afferent C-fiber nerves provide feedback-based autonomic micturition.[39,40] However, this emerged pathway does not maintain the sequential activation of sphincter relaxation and detrusor muscle activation. Therefore, bladder contraction occurs simultaneously with sphincter contraction and interferes with bladder emptying.[36] Similarly, damage to the pelvic (parasympathetic), hypogastric (sympathetic), or pudendal (somatic) nerves may result in reflex incontinence.[36]

While other types of urinary incontinence occur due to problems with the bladder or urinary system, functional incontinence is primarily caused by difficulties with mobility or cognition. It can affect people of all ages, but it is more common in elderly individuals and/or those with medical disabilities.[2] Common causes include arthritis, dementia, Parkinson's disease, stroke, or other limitations that make it difficult to move quickly or easily.[41-47]

Mixed urinary incontinence (MUI) most commonly combines urge and stress symptoms. While various mechanisms can result in MUI, it often results from conditions that impair function of both the bladder and urinary sphincter, such as neurologic disorders like spina bifida, spinal cord injury, prostate surgery, or pelvic radiation.[48] An interesting cascade can result from pudendal nerve impairment, causing pelvic floor laxity and uterine prolapse, leading to bladder-neck funneling, thus stimulating urethral afferent nerves to trigger reflex detrusor contractions.[49] The effects of an overflow stretched bladder can result in increased intra-abdominal pressure and activate stress incontinence. The overstretched bladder may also stimulate minor detrusor muscle contractions stimulating urgency.

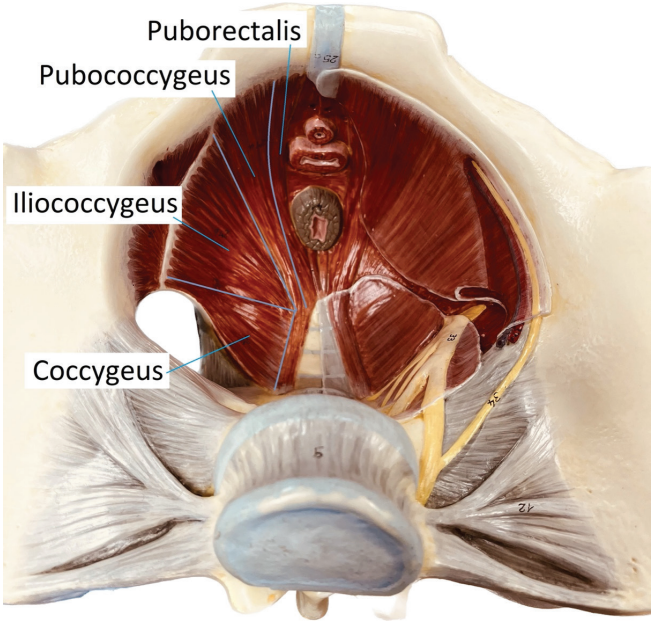
EVALUATION

A thorough history is the most important element for an accurate diagnosis. Validated brief questionnaires (available from *Ann Intern Med*, volume 145 on page 932-5) have sensitivities and specificities approaching 80% for distinguishing stress from urge incontinence in adult females.[50] Use of a voiding diary that tracks time of urination, estimated volume, symptoms associated with each void/leakage, any precipitating events, and large fluid intake, as well as measured urinary output, is often recommended.[51] It is important to recognize that the spectrum of gender expression may influence evaluations and treatment plans. A detailed genitourinary surgical and social history (including abuse) helps inform the physical examination and underlying causes. Considering the nature of the condition, patients are generally embarrassed and hesitant to fully disclose their experiences. Maintaining an open, compassionate, and nonjudgmental approach to this delicate and personal matter benefits accuracy of the information and completeness of the obtained history.

A complete history and physical examination can elucidate other contributing factors and diagnoses. The focused portion of the physical examination should include a complete urogenital, neurologic, and regional osteopathic structural evaluation. The osteopathic evaluation would include the regions of the lumbar spine, pelvis and sacrum, pelvic floor muscles and fascia, uterine/prostate mobility, and proximal lower extremities (Figure 1). Mobility and restriction of the pelvic structures can be superficially assessed via transabdominal palpation. However, they are best evaluated via transvaginal and transrectal examination, keeping in mind the importance of having a chaperone present.[52] Urodynamic tests have not been found to be very beneficial but may be warranted when the diagnosis is in question and/or treatment response is insufficient.[53]

FIGURE 1:

Model depicting muscles of the pelvic floor



Patients often present with a narrow perception of options. After failure or perceived failure of management, reviewing a treatment algorithm can help keep patients engaged in pursuing appropriate care.[54]

PSYCHOLOGICAL COMPONENT

Urinary incontinence is a very stigmatized condition that can prevent individuals from seeking medical care.[55,56] It is estimated that 75% of women affected by urinary incontinence have not sought medical care.[56-58] Men are half as likely to seek care compared to women.[59,60] Some research has found that Hispanic and Black women are less likely to seek medical treatment for urinary incontinence, but these findings have been inconsistent.[64,65] Friends and relatives of those affected, as well as physicians, may tend to normalize urinary incontinence following childbirth, also contributing to low levels of treatment-seeking among patients.[61] Another source of anxiety and hesitation is the cost of transportation and healthcare visits, as well as possible surgical interventions.[62,63]

The shame and embarrassment that often accompany urinary incontinence impairs people's ability to engage in day-to-day activities. The deterioration in quality of life for people with urinary incontinence is largely due to the secrecy that often surrounds it. This can lead to social withdrawal as they increasingly avoid activities outside their home where they may not have ready access to bathroom facilities.[75] Yip et al[75] found that patients with daily urinary incontinence reported more feelings of social isolation. The authors have observed family members and patients fabricating excuses to avoid outings or to leave activities abruptly to change clothes. This highlights the importance of addressing urinary incontinence in addition to any other causes of anxiety that may accompany leaving the house and attending social activities.

People with urinary incontinence report higher levels of anxiety and greater impairments to their quality of life with severity correlating with urinary incontinence symptom severity.[70,71] Depression is similarly correlated, with MUI having the strongest association.[72-74] These results illustrate the importance of considering both physical health and mental health when treating urinary incontinence.

Gascón et al[76] found that 41.9% of participants had sexual dissatisfaction, demonstrating the impact of incontinence on intimate relationships. The researchers hypothesized that fear of urine loss during intercourse partially contributed to low levels of sexual desire. This also suggests the influence of altered self-image with urinary incontinence.[77]

In some instances, it may become untenable for the patient to do activities of daily living due to their urinary incontinence. Thereafter, a caregiver is essential for obtaining food, assisting with toileting, and washing soiled clothes. However even if a patient has a caregiver, they may feel uncomfortable asking for help with these activities, especially when they have full mental capacity. These issues are potentially more challenging when the caregiver is the patient's adult child.[78]

It is imperative that physicians consider the potential association of incontinence with abuse. This abuse may include coercion, chastisement, and/or neglect.[79] Many factors are known to increase the risk of elder and patient abuse, including care dependence, low social support, and social isolation.[79] Urinary incontinence is associated with many of these factors, especially in older adults who are disproportionately affected by this condition where caregivers may not fully understand the patient's condition. Patient abuse may arise due to the emotional stress caused by the amount of physical labor required to care for the person with incontinence. There may be frustration with the nonlinear nature of recovery for those with urinary incontinence and even a belief that the incontinence is a conscious choice.[79] All of this highlights the importance of educating both the patient and the caregiver in order to help minimize the risk of elder and patient abuse.

MANAGEMENT OPTIONS

The following sections offer various treatment modalities as options for part of a holistic approach. Guidelines from various professional societies also offer additional support and may be cited when working to obtain resources and coverage for patients.[80-82]

Cognitive and Behavioral Interventions

Cognitive and behavioral interventions can reduce anxiety and/or depression and can influence incontinence as well. Although there has been very little research on the effectiveness of cognitive behavioral therapy (CBT) on the incidence of urinary incontinence, it has been shown to improve the quality of life for

patients with urinary incontinence.[91] Lifestyle changes that may help to reduce the symptoms of urinary incontinence include fluid management, weight loss, smoking cessation, and long-term moderate physical activity.[92-97] Patient home exercises may include bladder training and Kegel exercises; a 40% decrease in weekly incontinence was seen following six weekly bladder training sessions for functional or neurologic urinary incontinence.[97,98] Cavkaytar et al[99] found that Kegel exercises improved the symptoms of nearly 70% of participants with SUI and 40% of participants with MUI.

Pelvic Floor Physical Therapy

Pelvic floor therapy has been shown to be an effective treatment option for various types of urinary incontinence, including stress incontinence, urge incontinence, and mixed incontinence. Pelvic floor therapy includes exercises that strengthen the muscles of the pelvic floor and may reduce cystocele associated urethral malpositioning. Urethral sphincter strengthening may include Kegel exercises or other forms of resistance training.[100,101] Therapy may also include biofeedback techniques to help individuals learn how to correctly engage or relax their pelvic floor muscles and/or bladder. Therapy may also target incontinence-associated pelvic floor disorders such as uterine prolapse and pelvic tissue strain. Physical therapists specializing in pelvic floor disorders may provide better guidance on the most appropriate treatment options for an individual's specific needs.

Osteopathic Manipulative Treatment

Some patients are diagnosed with interstitial cystitis when their symptoms are due to myofascial imbalance.[102] Regional mechanical tension transmitted into the bladder fascia and muscle creates the possibility for both poor and/or early emptying. This tension can lead to urgency from increased nerve sensitivity or the tension-related misperception of a distended bladder. These concepts are also supported by other related studies: patients who have undergone treatment for prostatitis sometimes feel persistence of symptoms due to fascial strains resulting from their pathology.[21,22] Therefore, a quality physical examination should be performed to identify myofascial influences on urinary incontinence.[102]

Osteopathic treatment for urinary incontinence primarily focuses on improving tissue dysfunctions and imbalances of the musculoskeletal system. It addresses associated regional tissue disturbances with the goal of improving the function of the pelvis and associated regions. Osteopathic manipulative therapy (OMT) is a technique that often uses gentle manual forces to release restricted joint motion, and release problematic tension in the muscles and fascia. It may also be chosen to improve inhibited muscle tone, increase regional blood flow, and improve organ function. A systematic review of five clinical trials found OMT to be statistically significant and clinically relevant for women suffering from lower urinary tract symptoms (LUTS).[103]

When considering structures to evaluate and treat, the authors recommend checking regions that appear to be distant but have fascial connections directly to the bladder. These include the psoas and obturator internus muscles, and the medial and median umbilical ligaments. The pubococcygeus and iliococcygeus muscles directly support the bladder, and their fascia is contiguous with the bladder. The superficial and deep transverse perineal muscles influence pelvic pressure as well.

The following are techniques that would be beneficial to consider: sacral articulatory technique, myofascial release (MFR) of the pelvic region, doming the pelvic diaphragm, bladder MFR, uterus/prostate MFR, and psoas stretches.[104] For the deeper bladder-associated structures, transrectal or transvaginal MFR may be more effective for the pelvic floor, prostate, uterus, and ovary treatments. To augment the results, these can be performed bimanually with concomitant transabdominal pelvic-tissue engagement.

Sacral articulation: The dysfunction-related malpositioning of the sacrum and two halves of the pelvis will impact the tension of the muscles that cross the region. Additionally, when the positional relationships of the bones change, there is direct alteration of fascial tension due to the movement of boney fascial anchor points. Articulatory technique is an easy and effective option for sacral dysfunction correction. The hands can be stacked overlying the sacrum as demonstrated in Figures 2A and 2B. With slight anterior pressure, the sacrum can be rocked in any direction that is needed to engage restrictions to its motion. The restriction is then rhythmically engaged and disengaged at a rate of approximately 1 to 1.5 seconds each, or in time with the patient's breathing, until the palpation of motion restriction resolves.

FIGURE 2A:

Sacral ART demonstrated on a prone patient; physician's wrist splitting the top hand's third and fourth digits

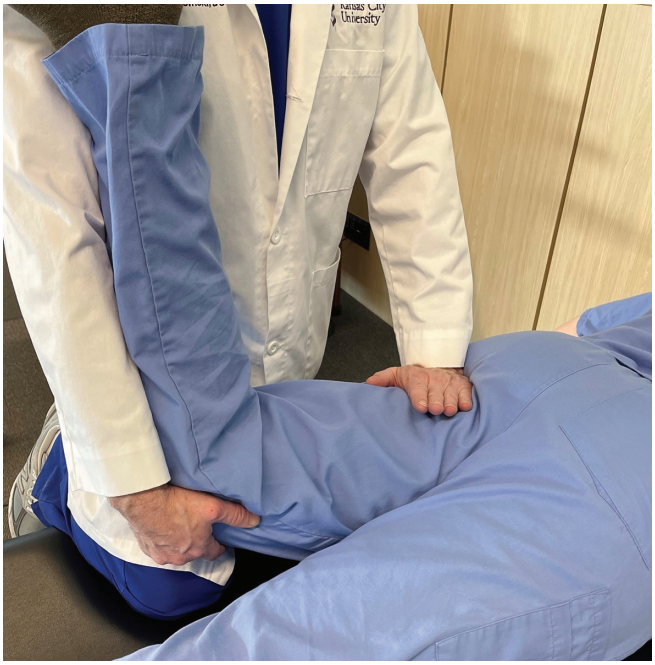
FIGURE 2B:

Alternate hand position for sacral ART demonstrated on a prone patient: physician's top hand lays perpendicular to the hand contacting the patient

Psoas stretches: While the bladder does not rest upon the psoas, portions of the ureter lay across this muscle, which may create a point of bladder traction as a result of tension within the psoas muscle and its fascia. The fascia of the inferior abdominal iliacus and psoas muscles is contiguous with the bladder and thereby also creates influence. While these psoas tissues may be evaluated and treated using a transabdominal approach, longitudinal stretching can be effective alone. A prone approach (Figure 3) can be utilized to gently engage the restriction to hip extension, with or without adding patient muscle contraction.

FIGURE 3:

Psoas stretch demonstrated on a prone patient



MFR to the pelvic bowl as an entire unit: The fascia of the pelvic bowl can be treated as a single unit. The superior aspects of that bowl can be influenced with suprapubic and lumbosacral junction hand placements as demonstrated (Figures 4A and 4B). Attention should be paid to the restrictions of motion of the fascia that is inferior and deep to those contact points. Thereafter, a direct restriction engagement or indirect tension balancing can be used to reduce resting tension and improve balance to the regional and bladder-related tissues.

FIGURE 4A:

MFR to the pelvic bowl demonstrated on a supine patient

FIGURE 4B:

MFR to the pelvic bowl demonstrated on a pelvic model

Transvaginal or transrectal direct stretching or MFR to the pelvic floor: Though the tissues can be influenced by distal contact, the authors find that greater and more immediate benefits are achievable through more direct palpation of the dysfunctional tissues. Several muscles of the pelvic floor are contactable through the rectum or vagina including the puborectalis (Figure 5A), pubococcygeus and iliococcygeus (Figure 5B), and coccygeus muscles (Figure 5C). Direct myofascial release is thereafter easily achievable through facing the treating palm towards the dysfunctional tissue, flexing the proximal or distal interphalangeal joint to 90° and then very gently pulling inferiorly until the muscles and fascia return to normal texture and tension.

FIGURE 5A:

Transrectal or transvaginal MFR to the pelvic floor demonstrated on a pelvic model with the physician's distal interphalangeal (DIP) joint bent to contact the puborectalis muscle

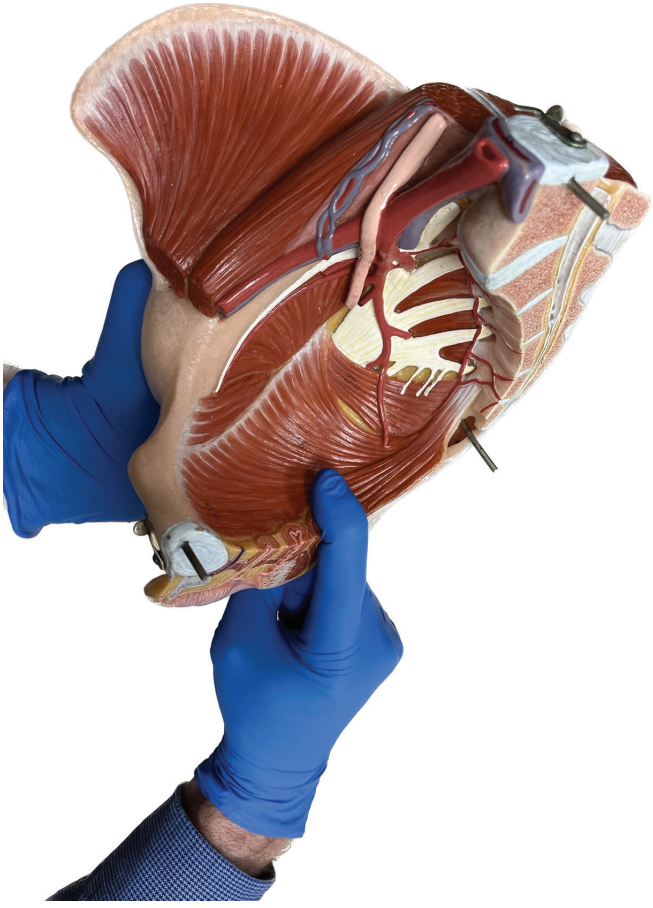


FIGURE 5B:

Transrectal or transvaginal MFR to the pelvic floor demonstrated on a pelvic model. with the physician's proximal interphalangeal (PIP) joint bent to contact the pubococcygeus and iliococcygeus muscles

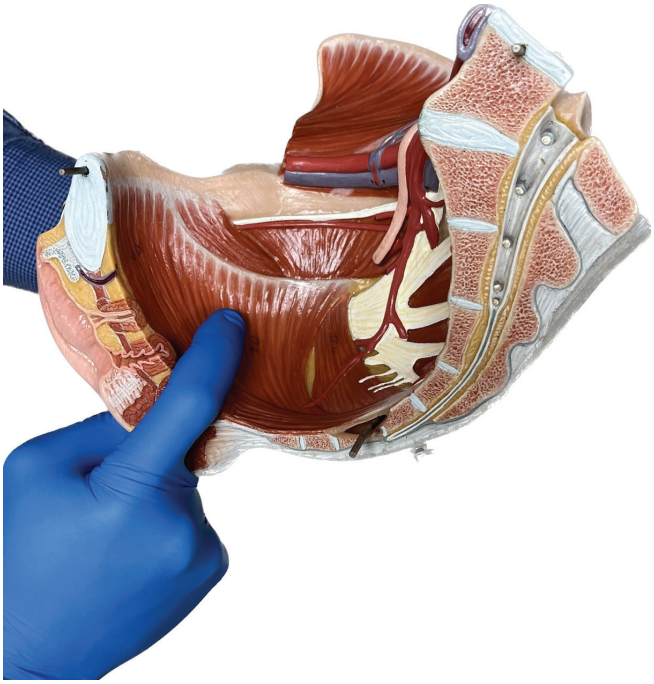
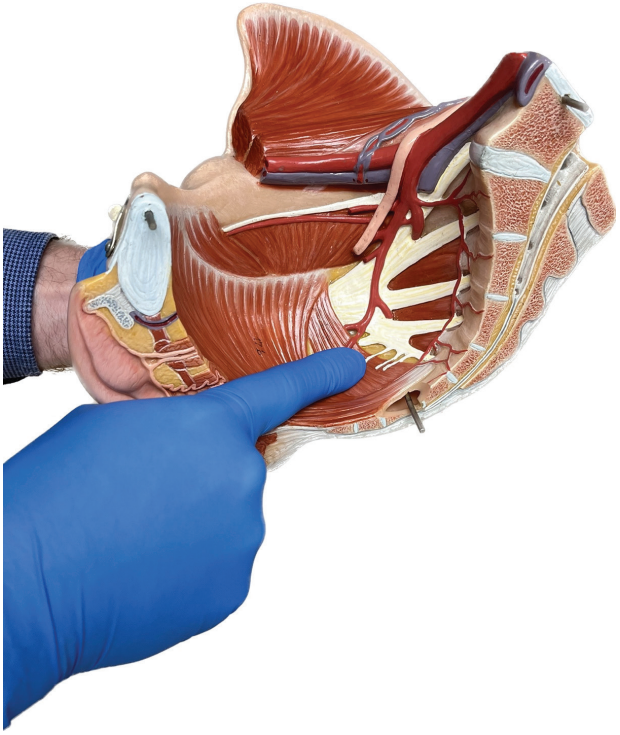


FIGURE 5C:

Transrectal or transvaginal MFR to the pelvic floor demonstrated on a pelvic model with physician contacting the coccygeus muscle



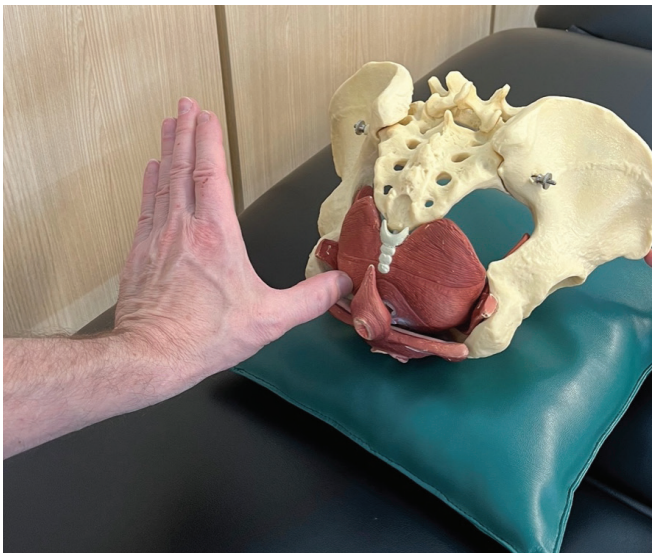
Doming of the pelvic diaphragm: Regional stretching of the pelvic diaphragm can be achieved externally from a prone, lateral recumbent, or supine position and is generally performed one side at a time. The center of the ischiorectal fossa is located approximately 1 inch posterior and medial to the most inferior aspect of the ischial tuberosity. Directly superior deep pressure is applied and held at this location (Figures 6A and 6B). Upon patient deep inspiration, the pelvic floor can be felt as it moves inferiorly, and a stretch is created around the physician contact point. During patient exhalation, deeper pressure is applied, and further anterior placement is achieved. Patient respiration is again used to create additional stretching. This pattern and sequence are followed until normal muscle and fascial tension are restored.

FIGURE 6A:

Doming of the pelvic diaphragm demonstrated on a prone patient

FIGURE 6B:

Doming of the pelvic diaphragm demonstrated on a pelvic model



Transabdominal MFR to the bladder: With transabdominal palpation, the bladder's lateral and superior fascia can be assessed (Figure 7), and with the same contact, can be treated with direct or indirect MFR.

FIGURE 7:

Transabdominal bladder MFR demonstrated on a supine patient

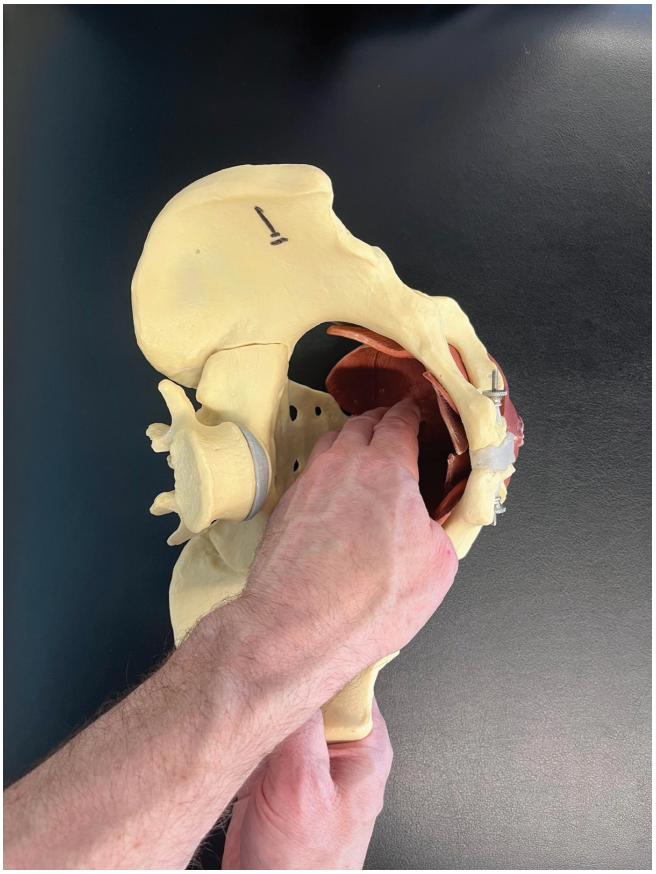
Transabdominal MFR to the prostate, uterus, or ovaries: At times, these structures represent the origin of fascial stress upon the bladder. While these structures and their supporting fascia are more easily palpated and directed for treatment through a rectal/vaginal (or with abdominal bimanual) approach, they can still be addressed transabdominally as demonstrated in Figures 8A and 8B. Thereafter, restriction of motion can be assessed and treated with direct or indirect MFR.

FIGURE 8A:

Transabdominal prostate MFR demonstrated on a supine patient

FIGURE 8B:

Transabdominal prostate MFR demonstrated on a pelvic model



Medications

The effectiveness of medication management in urinary incontinence can vary depending on the type and severity of the incontinence, as well as the individual patient. Medication is not always the best choice for everyone. For optimal results, pharmacology is best considered in combination with other approaches in this discussion. The following are some general considerations.

Antimuscarinic drugs, such as oxybutynin and tolterodine,[105-108] have been shown to be effective in reducing UUI in women and men.[105,108] These drugs relax the bladder detrusor muscle and allow for increased filling. This can decrease the frequency of the perceived need to urinate and reduce urgency of urination by decreasing neurologic signaling of bladder tension. Common side effects include dry mouth, constipation, and blurred vision and antimuscarinic agents are contraindicated with glaucoma.[109-112]

Beta-3 agonists, such as mirabegron, are effective in reducing UUI in both women and men. These drugs also provide detrusor muscle relaxation. They are generally well tolerated, but can cause common side effects such as headache, hypertension, and urinary tract infections.[113-115]

Estrogen therapy can be effective, particularly for UUI.[116] However, it may not be effective for all women and can have side effects such as vaginal bleeding and breast tenderness.[117,118] For those with estrogen contraindications, local estrogen cream may still be appropriate and effective.[119,120]

Alpha-adrenergic agonists, such as pseudoephedrine, can reduce SUI. This medication class tightens the muscles in the urethral sphincter and prostate, which can help improve control over urine flow. However, they can also have side effects such as increased blood pressure, anxiety, insomnia, and urinary retention.[121-125]

Assistive Medical Devices

There are several medical assistive devices that can be used in the management of urinary incontinence. Absorbent products include liners, pads, and briefs. They can be disposable or reusable, and come in a range of sizes and absorbency levels.[83] Catheters can be inserted into the bladder through the urethra or a small incision in the abdomen and can be used on a temporary or permanent basis, depending on the underlying condition. External collection devices are worn on the penis or around the vulvar labia to collect urine.[84] Urethral inserts are small tampon-like devices that are inserted into the urethra to help block the flow of urine. They can be used on a temporary basis, such as during physical activity or social events.[85] In patients with cystocele-related SUI, pessaries are inserted into the vagina to support the bladder and urethra.[86] These devices work well when minimal intervention is required or as part of a multifaceted approach.

Surgical Procedures

Patients with cystocele-related SUI may benefit from bladder taping or utilization of a sling or mesh implant to support the bladder and urethra.[87] Bladder augmentation or cystoplasty can be performed to increase filling volume.[88] Patients with urethral sphincter insufficiency may benefit from an artificial urinary sphincter.[89] Urethral stenosis may be treated with dilatation, urethrotomy, or urethroplasty.[90]

CONCLUSIONS

Urinary incontinence presents many challenges for patients, their support systems, and their care teams. It presents both complex diagnostic and treatment challenges that often require heightened awareness to the social, emotional, psychological, and physical components. This article highlights the importance of a biopsychosocial approach to care, which often requires regular re-evaluation of initial therapy and the engagement of patients in the follow-up process. This can be enhanced by reassurance that options of additional or alternative modalities are available. With compassion and persistence, effective management may be found that can greatly improve patients' lives.

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