

The Use of Specific Myofascial Release Techniques by a Physical Therapist to Treat Clitoral Phimosis and Dyspareunia

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ABSTRACT

Introduction: Clitoral phimosis is adherence of the clitoral prepuce to the glans and can result from inflammatory dermatoses, blunt trauma, chronic infection, and inadequate hygiene.

Aim: The aim of this report was to demonstrate myofascial release (MFR) techniques utilized by a physical therapist to treat clitoral phimosis.

Methods: The patient was a 41-year-old woman with low back pain, a bruised sensation of her pubic region, vulvar pain provoked by sexual arousal, decreased clitoral sensitivity, dyspareunia, and anorgasmia. The patient sustained a blunt trauma injury to the vulva. Examination revealed lumbosacral and pelvic dysfunction, pelvic floor muscle dysfunction, bone bruise of the pubic bone, and decreased retractability of the clitoral prepuce and scarring. Eleven physical therapy sessions over 16 weeks included stretching, joint mobilization, muscle energy techniques, transvaginal pelvic floor muscle massage, clitoral prepuce MFR techniques, biofeedback, Integrative Manual Therapy (IMT) techniques, nerve mobilization, and therapeutic and motor control exercises. The patient applied topical clobetasol 0.05% cream for 30 days.

Results: The low back pain was reduced and full resolution of her vulvar pain, dyspareunia, and pubic bone bruised sensation resulted. Mobility of the clitoral prepuce was restored. Normal clitoral sensitivity and clitoral orgasm returned. Symptom resolution was confirmed upon telephone evaluation at 6 months.

Conclusion: With proper training, physical therapists managing patients with dyspareunia can identify clitoral phimosis and use specific MFR as a conservative treatment approach. Physical therapy techniques can be performed alone or in concert with medical therapy.

Key Words: bone bruise, clitoral phimosis, dyspareunia, myofascial release, pelvic pain, pelvic floor muscle dysfunction, physical therapy, vulvar pain

INTRODUCTION

Clitoral phimosis occurs when adhesions form between the glans of the clitoris and clitoral hood or prepuce.¹ Normally the prepuce, which is the soft tissue around the clitoral glans, provides a complete or partial covering of the glans and is retractable.¹ The clitoris is a 3-dimensional gland approximately 3 to 6 cm in size and its body is 1 to 2 cm long and attaches to the pubic arch, urethra, and vagina.^{2,3} Its erectile components include the bulbs and paired corpora that are continuous with the crura and its nonerectile component is the glans clitoris.³ The clitoris is innervated by the dorsal nerve of the clitoris.² During sexual arousal, the clitoris engorges and is exposed from under the prepuce. Upon clitoral phimosis, the prepuce tightens around the glans and adheres resulting in loss of normal mobility and may lead to impaired clitoral sensitivity, anorgasmia, and pain.^{1,4,5}

Clitoral phimosis can be identified by physical examination of the genital region. Careful evaluation of the clitoris involves exposing the glans by retracting the clitoral prepuce with a finger on either side in a cephalad and superior displacement.⁵ Clitoral examination would be considered abnormal if partial or incomplete foreskin retraction occurred limiting the view of the glans.⁵

Causes of clitoral phimosis include lichen sclerosis, an inflammatory dermatosis, trauma, chronic infections such as vaginitis, or poor hygiene.⁵⁻⁷ In cases of lichen sclerosis, vulvar and clitoral scarring, adhesions, and atrophy can occur causing severe changes in the vulvar and clitoral architecture.⁶ Blunt or accidental pubic or perineal trauma can result in scarring reducing prepuce elasticity.^{5,7} Other sexual

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complaints from blunt perineal trauma include diminished genital sensation, diminished or absent orgasm, decreased vaginal lubrication, impaired arousal, clitoral pain, and dyspareunia.^{7,8} Poor hygiene may lead to smegma accumulation under the foreskin forming smegmatic pseudocysts and cause chronic inflammation.¹ Decreased prepuce mobility and adhesion formation may result.

The prevalence of clitoral phimosis is estimated to be 22% among women with sexual dysfunction.⁵ There is no standard treatment for clitoral phimosis; however, current medical management and treatment may include the use of topical and/or injectable corticosteroids and surgical release.¹ The surgical release of the prepuce from the glans has been referred to as clitoroplasty, hoodplasty, dorsal slit surgery, or hydrodissection with a reverse V-plasty.^{4,9-11}

Clitorodinia, recognized as pain confined to the clitoris when no other clinical abnormality is found, is included in the localized vulvar pain classification by the International Society for the Study of Vulvovaginal Diseases and symptoms can include constant soreness and hypersensitivity of the clitoris.^{12,13} Preliminary evidence indicates that physical therapy (PT) is effective in the treatment of dyspareunia related to vulvar pain syndromes, such as vulvodinia, and pelvic floor muscle dysfunction (PFMD).¹⁴⁻¹⁷ PT has been an accepted treatment approach or as part of a multidisciplinary approach for vulvar pain disorders.¹⁸⁻²³ Manual PT techniques used by pelvic floor physical therapists in the treatment of vulvar pain, PFMD, and sexual pain include trigger point massage, connective tissue or myofascial and scar tissue release, massage, joint mobilization, muscle energy techniques (METs), visceral and urogenital manipulation, passive stretching, and adverse neural tension releases.²⁴⁻²⁷ Thus, pelvic floor physical therapists could be employed to treat clitoral pain.

The American College of Obstetricians and Gynecologists advises the use of myofascial release (MFR) by physical therapists as a treatment guideline for vulvodinia.²⁸ MFR techniques refer to the manual massage techniques to lengthen or stretch the fascia and release abnormal bonds between fascia and integuments.²⁹ The MFR technique has been shown to improve the viscoelastic properties of skin with a scar.²⁹ This is accomplished by manipulating the tissue causing a change in the viscosity of the ground substance of the fascia and allowing the connective tissue to reorganize into a more flexible, mobile, functional tissue.²⁹ The goals of MFR are to improve tissue elasticity and mobility to increase circulation to the tissue and to alleviate pain.²⁹⁻³¹ Thus, manual PT techniques such as MFR can potentially be applied to women suffering with sexual pain due to clitoral phimosis.

No current evidence supports the use of MFR techniques for the treatment of clitoral phimosis. This case report, which involves PT management of a patient with clitoral phimosis and dyspareunia, demonstrates the use of manual therapies to address concurrent lower quarter orthopedic issues and specific MFR techniques applied to the clitoral prepuce as a conservative corrective approach.

CASE DESCRIPTION

History

The patient was a 41-year-old gravida 1 para 1 woman referred to PT with a diagnosis of PFMD from her local gynecologist. She complained of vaginal pain 4/10 on a Numeric Pain Rating Scale (NPRS),³² which began after her cesarean section 6 years ago and worsened after a subsequent tubal ligation and continued to be persistent. For the NPRS, pain is rated from 0 to 10, where 0 is no pain and 10 designates severe pain.³² She then sustained a blunt trauma to her pubic and perineal region after her toddler son charged forcibly with his head against her pubic bone region. Labia and clitoral bruising and swelling resulted at that time but were no longer present at the time of the examination. She reported having onset of chronic low back pain (LBP) after a motor vehicle accident, which occurred 5 years prior to the pregnancy. Magnetic resonance imaging at the time had revealed L5-S1 herniated nucleus pulposus. She was referred to a local physical therapist who was specialized in pelvic floor muscle (PFM) rehabilitation and was seen for a consultation only.

Upon the evaluation 5 months later, she had constant LBP rated as 4/10 and worsened with prolonged standing. She reported having a current persistent bruised sensation of the anterior pubic symphysis region, which was rated 3/10. She reported feeling intermittent post-coital vulvar stinging. Her vulvar pain was rated 2/10 and increased upon arousal, prolonged sitting, and tampon insertion. She also reported decreased clitoral sensitivity, clitoral pain, and decreased ability to achieve clitoral orgasm.

Systems Review

The patient had been previously diagnosed with dyspareunia, vaginismus, and hypoactive sexual desire disorder. No other prior medical history was reported.

Examination and Evaluation

The women's health PT examination for evaluation of vulvovaginal pain has 2 components: a comprehensive orthopedic examination of the lower quarter (including spine, pelvic girdle, and lower extremities) and a PFM examination.^{33,34} Physical examination of the lower quarter (findings noted in Table 1) revealed

Table 1. Examination Orthopedic Tests

	Finding	Rationale for Test
Pelvic Girdle Standing	+ left elevated (upslip dysfunction)	Assess for pelvic girdle asymmetry ³⁵
Standing Flexion Test and Stork (Gillet) Test	+ left sacroiliac joint	Assess for sacroiliac joint restriction on one side ^{36,37}
Pubic Symphysis Height	+ left superior and tenderness/bone bruise	Assess for pubic symphysis malalignment ³⁵
Palpation	+ severe tenderness left pubic bone, + moderate tenderness left sacroiliac joint, C-section scar, and left sacrotuberous ligament	Assess soft tissue for tenderness, scar pain, and myofascial trigger points
Active range of motion Thoracolumbar region	+ mild impaired lateral flexion	Assess spinal range of motion deficits
Prone Sacral Base and L5	+ right sacral base deeper (sacral rotation left in coronal plane)	Assess for alignment of the sacral bases and L5 ³⁵
	+ L5 deeper right posterior arch (L5 rotated left in coronal plane)	
Ober Test	+ left iliotibial band	Assess for length deficits iliotibial band ³⁸
Thomas Test	+ left psoas muscle	Assess for length deficits psoas, iliotibial band/tensor fasciae latae, rectus ³⁸
Standard Side-Lying Piriformis Test	+ bilateral piriformis muscles	Assess for length deficits piriformis muscles ³⁸
Passive Straight Leg Raise	+ left sciatic nerve at 40°	Assess for neural tension sciatic nerves ^{39,40}

a pelvic obliquity with the left ilium elevated compared to the right side, also referred to as a left pelvic upslip dysfunction or superior shear.³⁵ The therapist stands behind the patient and palpates both superior aspects of the iliac crests and evaluates to see any height difference for this test.³⁵ Pelvic girdle mobility tests such as the Standing Flexion Test³⁶ and Stork Test^{36,37} were positive for left iliosacral (or sacroiliac joint) dysfunction. In the Standing Flexion Test, the therapist stands behind the patient and grasps around the ilium while palpating the inferior aspects of posterior superior iliac spine (PSIS) on either side.³⁵ The patient is instructed to bend forward, while the therapist monitors which PSIS moves more cephalad. The side that moves more cephalad is the positive or dysfunctional side. For the Stork Test, the therapist also grasps the ilium and palpates the inferior aspect of the PSIS with one thumb and the other thumb is placed midline on the sacral promontory.³⁵ The patient is asked to move their knee upward toward the ceiling. A positive finding is the PSIS that demonstrates no movement caudal or moves cephalad.³⁵ A normal finding is when the thumb on the PSIS moves caudal compared to the thumb on the sacral promontory.³⁵

She had a sacral rotation left positional dysfunction and lumbar vertebrae 5 (L5) positional dysfunction rotation left, both assessed in prone. For testing, the therapist places their palpating thumbs on the sacral bases and compares the depth of the sacral bases and then afterward places thumbs on the posterior arches of L5 and determines the depth of each

posterior arch in the coronal plane.³⁵ Upon prone palpation of the posterior sacral bases and L5, the sacral base was deep on the right and L5 posterior arch was deeper on the right. Thus in the coronal plane, the sacrum and L5 had a positional dysfunction of rotation left. She presented with a pubic symphysis dysfunction with a superior shear or elevation of the left pubic bone compared to the right, which was tested in supine as per Greenman's Pelvic Girdle Testing,³⁵ and severe palpable tenderness to the left pubic bone region. Other moderate palpation pain was found at the left sacroiliac joint, cesarean section scar, and left sacrotuberous ligament. She had mild active range of motion (AROM) deficits of the thoracolumbar region into lateral flexion bilaterally. Length deficits were noted in her left iliotibial band via Ober Test,³⁸ left psoas via the Thomas Test,³⁸ and bilateral piriformis muscles confirmed via the Standard Test in Side-lying.³⁸ There were minimal sensation deficits to light touch in the right L2-L4 dermatomes and Achilles deep tendon reflexes bilaterally were 1+. There was left sciatic nerve tension revealed during a Straight Leg Raise (SLR) Test at 40°. Her right SLR Test was negative at 60°, a marked difference from the left. A passive SLR test with the knee extended and hip progressively flexed while the patient is in the supine position may reveal adverse tension along the sciatic nerve.^{39,40} When symptoms are reproduced or there is a marked difference between the sides, the test is considered positive for nerve tension.³⁹

The PFM examination is comprised of observation of the perineum for integumentary integrity and scars, sensory testing of S2-S5 dermatomes, anal wink reflex testing, Cotton Swab Testing of the vestibule, and palpation of the superficial and deep PFMs for tender points and myofascial trigger points. Internal examination of the PFMs includes strength, endurance, and length testing. Examination for pelvic organ prolapse is also included when applicable.^{27,33,41,42} Surface electromyography (sEMG) biofeedback is another objective test that can be employed to determine PFM resting tone, endurance, coordination, and postcontraction relaxation.^{33,43}

The PFM examination was performed (findings noted in Table 2) immediately following the orthopedic examination. Observation of the patient's perineum revealed clitoral prepuce fusion with small hypopigmented epithelium along the attachment area and decreased tissue mobility upon attempted retraction. The Clitoral Prepuce Mobility Test^{5,7} is performed by placing a finger along either side of the prepuce. The tester passively moves the prepuce in a cephalad direction to retract it away to expose the glans. The tester then classifies the outcome into Grades 1 to 3. Grade 1 (or mild) indicates 50% of the glans covered, Grade 2 (or moderate) indicates 75% coverage of the glans, and Grade 3 (or severe) is given upon complete inability to expose 100% of the glans clitoris.^{5,7} The right side of the patient's clitoral prepuce appeared 90% adhered onto the clitoris, whereas the left side appeared 50% adherent. Since there was ability to expose the glans yet

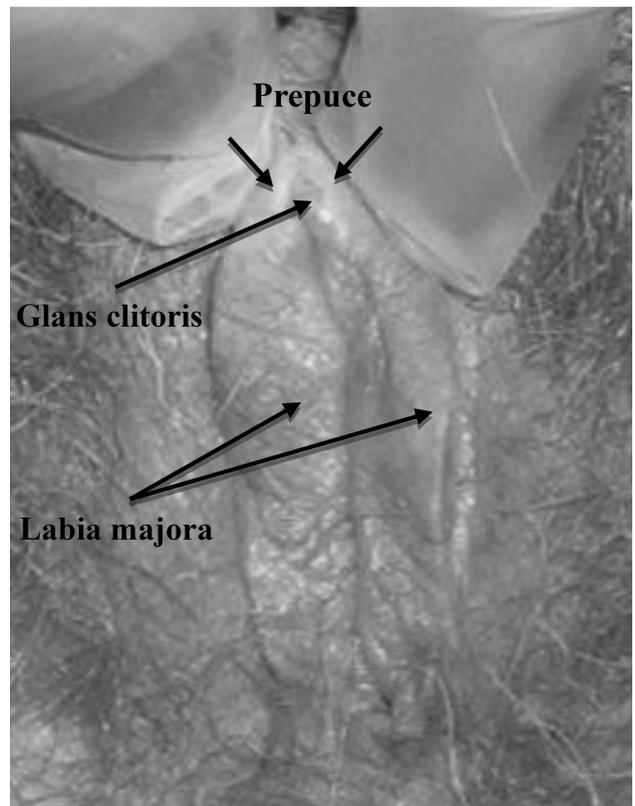


Figure 1. Grade 2 clitoral phimosis, with moderate adherence of the prepuce to the glans.

apparent moderate adherence, Grade 2 phimosis was designated (Figure 1). She was advised to see her gynecologist to assess the clitoral phimosis. The Cotton Swab Test or Q-tip Test²² was performed to the vestibule to test for provoked localized vestibulodynia (PLV) formerly referred to as vulvar vestibulitis. The Cotton Swab Test is performed by gently touching the vulvar vestibule in a random fashion (1, 4, 6, 8, and 11 o'clock) with a lubricated cotton swab and asking the patient to rate the pain on NPRS.^{22,45} The patient's Cotton Swab Test was negative. Anal wink reflex testing was normal. Dermatomal testing to light touch using a gloved finger revealed mild impaired sensation on the left labia majora. Pelvic organ prolapse testing was not indicated.

Systematic palpation of the superficial PFMs using one gloved digit revealed mild left superficial transverse perineal muscle pain. The patient was instructed to report pain as none, mild, moderate, or severe. Palpation for myofascial trigger points also occurred. Systematic intravaginal digital palpation of the deep PFMs using one gloved digit^{27,33} comparing qualitative reporting of pain by the patient revealed moderate pain of bilateral pubococcygeus and iliococcygeus muscles. Severe pain was reported for bilateral coccygeus and obturator internus muscles. Manual muscle testing of the PFMs was performed by inserting one

Table 2. Examination

Pelvic Floor Muscle Examination	Finding
Clitoral Prepuce Mobility Test ^{5,7}	Grade 2 or moderate adherence
Cotton Swab Vestibule Testing ²²	Negative
Anal Wink Reflex Testing ³³	Normal
Dermatomal Testing (light touch with digit) ³³	Mild decreased sensation left labia majora
Superficial PFM Palpation ^{27,33}	+ mild pain left superficial transverse perineal muscle
Deep PFM Palpation ^{27,33}	+ moderate pain bilateral pubococcygeus and iliococcygeus, + severe pain bilateral coccygeus, bilateral obturator internus
MMT PFMs	4-/5, weakness
Endurance Testing PFMs ⁴⁴	6 second hold, impaired
sEMG Biofeedback Testing ^{33,43}	Resting average: 3.8 (uv), mild hypertonicity or elevated resting tone
Abbreviations: MMT, Manual muscle testing; PFM, Pelvic floor muscle; sEMG, Surface electromyography; uv, microvolts.	

gloved digit into the vaginal canal beyond the level of the hymenal ring and levator ani.²⁷ The patient is asked and instructed to contract the PFMs “up and in.” Scoring is based on the clinician’s intravaginal palpation of the PFMs upon a volitional contraction and verbal instructions to contract the PFMs “up and in.”^{42,44-46} Scoring her PFM strength 0 to 5 using an Oxford grading scale revealed mild weakness at 4-/5 upon a single maximal voluntary contraction (MVC). Ideal is 5/5 from an Oxford grading scale of 0 to 5. 0 = no contraction; 1 = flicker or twitch; 2 = weak squeeze without lift; 3 = fair squeeze with definite lift; 4 = good with a palpable lift, able to hold against resistance; 5 = strong squeeze, able to hold against strong resistance.^{42,44,46} For a grade of 4-/5, the patient demonstrated ability to hold against resistance yet had an insufficient lift. Her inability to hold the PFM endurance contraction after only 6 seconds is suggestive of decreased PFM endurance. Standard endurance testing is the time in seconds (up to 10) that the MVC is sustained before a reduction in 50% or more power is palpated.⁴⁴ With a gloved digit inserted intravaginally by the examiner, the patient was then asked to lengthen her PFMs by gently bulging downwardly with a gentle Valsalva maneuver and she demonstrated impaired ability to lengthen bilaterally. sEMG biofeedback of the PFMs using a Pathway internal vaginal EMG sensor by The Prometheus Group and the Synergy 3D version 1.2.0.1 by The Prometheus Group indicated mild elevated tone or overactivity (referred to as hypertonicity or high-tone previously) at an average of 3.84 microvolts (μv), which was taken over 120-second time frame. A resting PFM sEMG reading at or less than 2.0 (μv) is considered to be within normal limits and more than 2.0 (μv) has been defined as high-tone PFMs in another study by Crisp et al.⁴⁷ Monitoring a resting baseline for 120 seconds has been used by Both and Laan,⁴⁸ which measured PFM activity and vaginal blood flow using a 2-minute baseline resting period before testing.

Diagnosis

The PT diagnoses based on the examination findings included left sacroiliac joint dysfunction, L5 positional dysfunction, pubic symphysis dysfunction, left sciatic nerve tension, superficial and deep PFMD (pain and shortening), and Grade 2 or moderate clitoral phimosis. Although it did appear that some of her sexual pain may have been a result of the blunt trauma to her pelvis, her primary goal of PT was to resume sexual relations with her husband and restore orgasm. Thus, the patient was classified into Preferred Physical Therapist Practice Pattern C (Impaired Muscle Performance) in the *Guide to Physical Therapist Practice*.⁴⁹

Prognosis

The patient was able to achieve isolated PFM contractions and able to execute the lengthening or bulge component to the exercise well during the treatment portion of the evaluation after instruction. The patient was extremely motivated to resolve her sexual pain to improve her relationship with her husband. However, this was her second attempt at PT and she was willing to travel far to receive comprehensive PT care. Her case was complicated by having many orthopedic issues that also needed to be addressed via a comprehensive intervention approach. Other studies involving PT and/or sEMG to help resolve vulvar pain and PFMD report that the number of treatment sessions is an average of 7 to 8¹⁴⁻¹⁶ and maximum of 16^{14,50}; therefore, based on the complexity of her orthopedic and PFM examination findings, she was expected to achieve goals of resolved LBP and pubic pain, PFMD, and dyspareunia in 12 to 16 weeks. However, because of the void of information on the management of clitoral phimosis, the prognosis for improving this condition was uncertain. Although twice weekly PT was recommended, she was able to attend only 1 session weekly as she lived 1.5 hours away from the clinic.

Intervention

The importance of correcting this patient’s biomechanical and the PFMD simultaneously to ensure the best possible outcome was explained. The use of MFR to address the adhesions was explained and permission to perform MFR to the prepuce as an intervention for her clitoral phimosis was obtained. She was encouraged to see her gynecologist immediately to assess the clitoral phimosis because she reported that no other practitioner had assessed her clitoris. (For interventions and rationales, see Table 3.)

After the PFM examination was complete, she was instructed in her home exercise program (HEP). Forty repetitions (20 repetitions twice per day) of PFM contractions or Kegel exercises were prescribed. She was specifically instructed to perform a 6-second “up and in” contraction followed by a 6-second bulge or PFM lengthening to achieve full PFM relaxation and to exercise the PFMs through its full range of motion. Glazer’s protocol⁵⁰ was used as a guideline for her HEP, which has been shown to reduce vulvovaginal pain by having the patient contract the PFMs for 10 seconds followed by 10-second rest period for 40 repetitions twice daily using a home PFM sEMG device. Because she demonstrated fatigue after only 6 seconds, a prescriptive HEP was issued of 6-second endurance hold and 6-second rest for only 40 repetitions daily because of her tolerance at the time of consultation. Prescribing the exact Glazer’s protocol immediately may have increased her PFM pain due

Table 3. Intervention

Intervention	Rationale
Session 1	
Orthopedic and PFM examination	To determine causes of pain and dysfunction
Instructed PFM contraction and lengthening HEP	To facilitate patient independence and improve PFM strength and length ⁵⁰
MET pubic symphysis	To correct malalignment and reduce adverse tension of tissues in the surrounding area ³⁷
sEMG biofeedback PFM	To determine baseline resting level ^{33,47,48,50}
HEP LQ stretches	To increase length of the lower quarter muscles ⁵¹
Session 2	
STM to LS paraspinals, left quadratus lumborum	To reduce pain, reduce spasm, and improve effective of MET ^{38,52}
MET left pelvic upslip correction	To correct pelvic asymmetry ^{53,54}
Transvaginal PFM massage	To reduce pain, tone, trigger point, spasm, and tender points and lengthen muscles ⁵⁵
Clitoral prepuce MFR and instructed for HEP	To release myofascial adhesions from prepuce off of the glans, to facilitate independence
Hip adductor PRE and trunk/core stabilization exercises	To increase strength of core resulting in increased PFM strength and decreased LBP ^{56,57}
Session 3	
MET C6	To correct alignment of C6 and reduce cervical spine pain ^{58,59}
Transvaginal PFM massage	To reduce pain, trigger point, spasm, and tender points and lengthen muscles
C-section scar mobilization	To increase mobility of the scar tissue and reduce pain ^{29,30}
TrA isolated exercises using RUS	To increase awareness and strengthen core to reduce LBP and increase PFM strength ^{59,60}
Session 4	
STM left piriformis	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ³⁸
Left sacroiliac joint mobilization/MET	To correct the sacroiliac joint mobility/position ⁵³
MFR clitoral prepuce	To release myofascial adhesions from prepuce off of the glans
IMT bone bruise technique on pubic bone	To resolve the bone bruise pain sensation ^{58,61}
Session 5	
Transvaginal PFM massage	To reduce pain, trigger point, spasm, and tender points and lengthen muscles
Clitoral prepuce MFR	To release myofascial adhesions from prepuce off of the glans
PFM reeducation using RUS	To improve PFM motor control and recruitment ⁶²
Session 6	
Transvaginal PFM release	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ⁵⁵
MFR sacral region and hamstrings	To release tension along the sacrum, sacral nerves, and sciatic nerve path
Sciatic nerve mobilization	To reduce neural tension ^{39,40}
Clitoral prepuce MFR	To release myofascial adhesions from prepuce off of the glans
Session 7	
Transvaginal PFM massage	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ⁵⁵
AROM lumbar spine	To assess range of motion improvements
STM lumbosacral region	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ^{38,52}
C-section scar mobilization	To increase mobility of the scar tissue and reduce pain ^{29,30}
Clitoral prepuce MFR	To release myofascial adhesions from prepuce off of the glans
Session 8	
Instruction in core stabilization exercises	To reduce LBP and increase LS mobility, strengthen core ⁶³
Low back stretching exercises	To reduce LBP, increase muscle length, and increase LS mobility ⁶³
Motor control exercises on all-fours	To reduce low back pain and increase lumbar stability ⁶⁴
Clitoral prepuce MFR	To release myofascial adhesions from prepuce off of the glans
Transvaginal PFM massage	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ⁵⁵

(continues)

Table 3. Intervention, Continued

Intervention	Rationale
Session 9	
STM LS	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ^{38,52}
Transvaginal PFM massage	To reduce pain, trigger point, spasm, and tender points and lengthen muscles ⁵⁵
Passive LQ stretching exercises	To lengthen LQ muscles and to improve LQ ROM ⁵¹
Core stabilization exercises	To reduce LBP and increase LS mobility, strengthen core ^{56,57}
Session 10	
Cotton swab testing of vestibule	To reevaluate, determine any changes
sEMG biofeedback PFM	To reassess for changes of the baseline resting level
PFM palpation	To reevaluate, determine progress made
Review of HEP	To promote independence for discharge
Abbreviations: AROM, active range of motion; C6, cervical vertebrae 6; HEP, home exercise program; IMT, Integrative Manual Therapy; LQ, lower quarter; LS, lumbar spine; MET, muscle energy technique; MFR, myofascial release; PFM, pelvic floor muscle; PRE, progressive resistive exercises; RUS, rehabilitative ultrasound; sEMG, surface electromyography; STM, soft tissue mobilization; TrA, transversus abdominis.	

to possible overuse. Physical therapists are trained to prescribe exercise repetitions, sets, and frequency based on their objective information of muscle strength, endurance, and tolerance and adjusts the program as the patient progresses.

In addition to addressing her PFM findings, her orthopedic findings also required immediate attention. Given that her primary complaint was clitoral pain, a pubic symphysis malalignment correction was prioritized at the first session. A pubic symphysis malalignment can cause adverse tensions on the surrounding tissues. Her pubic symphysis malalignment was corrected using an MET.³⁵ This technique is performed with the patient in the supine position with hips and knees bent while the therapist manually resists hip abduction (3 repetitions) followed by resisted hip adduction (3 repetitions). Each contraction is held for 3 to 5 seconds. Her pubic symphysis realigned and her pain reduced to 2/10. A muscle stretching program for her iliotibial band, psoas, and piriformis as per Saunders and Saunders⁵¹ was prescribed to be performed for 30 seconds each for 5 repetitions, twice daily. Prescribed static stretching of 30-second duration is an optimal time to stretch for efficient lengthening to occur.⁶³

At visit 2, the patient denied any symptom improvement and reported that performing the PFM contraction exercises seemed to increase her low back pain. She indicated using topical clobetasol 0.05%⁶⁵ to the clitoral prepuce once daily for 1 month as prescribed by her gynecologist before returning to PT. Despite the use of the clobetasol topically, the clitoral phimosis remained at Grade 2. This treatment session focused on addressing the other orthopedic findings from the initial examination and addressing more of her PFM examination findings. Soft tissue mobilization (STM) or massage of her lumbar spine

paraspinal muscles and her left quadratus lumborum was performed with the patient in side-lying.³⁸ Massage has been found effective in treating persistent low back pain.⁵² An MET was performed to correct her left pelvic upslip. This MET is performed by having the patient perform an isometric contraction of the quadratus lumborum against manual resistance in side-lying and upon relaxation the neuromuscular apparatus becomes briefly refractory, or unable to respond to further excitation.^{53,54} Passive stretching the muscle immediately following its isometric contraction incrementally restores range of motion and position of the ilium.⁵³ Transvaginal PFM massage using the Thiele stripping technique⁵⁵ was performed on both sides for several minutes to reduce pain, improve muscle tone, and increase the length of the muscles. This is performed with one gloved digit inserted intravaginally with the use of olive oil as the lubricant. The Thiele stripping massage is a muscle massage from origin to insertion along the muscle fibers direction with tolerable pressure applied by the therapist to the patient's PFM in a systematic manner and has been proven beneficial in patients with high-tone PFMD and interstitial cystitis.⁵⁵ Each PFM muscle is addressed individually and on either side.⁵⁵ The massage motions are performed repeatedly until a softening or release is noted. In addition, sustained transvaginal massage strokes were also applied inferiorly and in a posterior manner across the muscle bellies to provide manual lengthening or stretching to the PFMs. Clitoral prepuce MFR and stretching was performed (Figures 2 and 3). The technique is performed by first applying a small amount of topical lubricant to the clitoral prepuce. In this case, olive oil was used as the lubricant. While a gloved finger or a cotton swab stabilized the clitoris, a prolonged MFR or sustained stretch was applied in the direction away

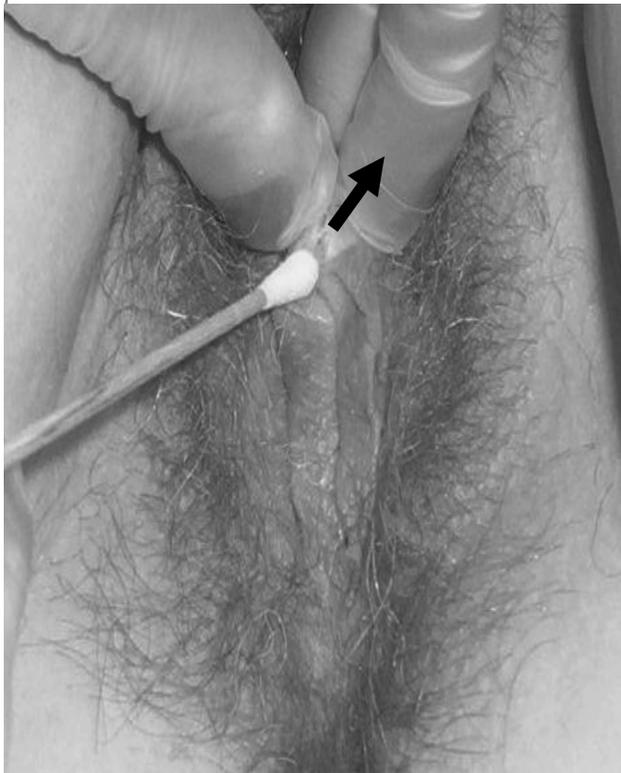


Figure 2. Myofascial stretch force is applied to the clitoral prepuce on the diagonal plane upward while the glans is stabilized gently with the cotton swab tip.

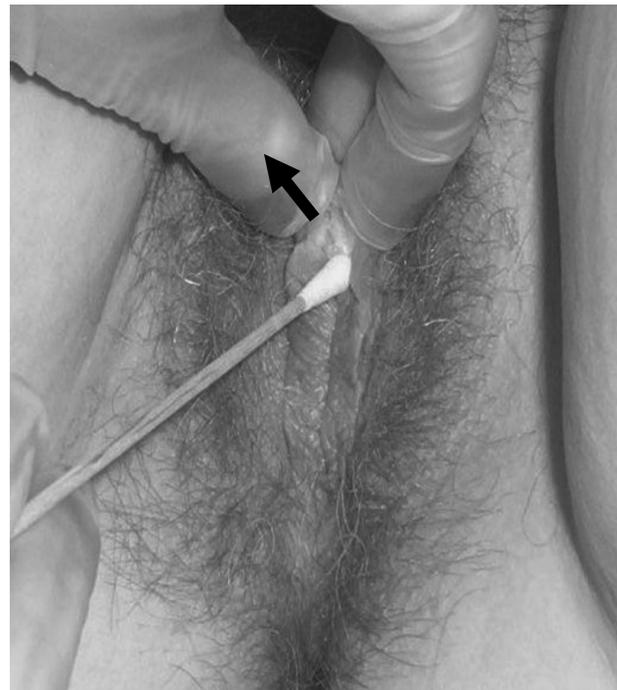


Figure 3. Myofascial stretch force is applied to the clitoral prepuce on the diagonal plane upward while the glans is stabilized gently with the cotton swab tip.



Figure 4. Myofascial stretch force is applied to the clitoral prepuce cephalad and on diagonal planes with both fingers.

from the fixated clitoris by the therapist's other finger. This technique was performed along the entire length of the prepuce. When the stretch was prolonged, a slight stretching or mild burning sensation was felt local to the area being stretched. The technique can also be performed bilaterally having the therapist use his or her fingers to perform the stretch in a cephalad direction to the prepuce without stabilizing the clitoris (Figure 4). The combination of MFR techniques is applied for several minutes until a release is noted or the patient reports intolerance. The patient was instructed to perform a variation of the clitoral prepuce MFR technique at home on herself as tolerated using lubricant. Because the PFM contraction HEP was reported to have caused an increase in her LBP, she was told to discontinue them until her low back dysfunction was corrected. A hip adductor progressive resistive exercise in side-lying and a trunk/core stabilization exercise were instructed and given for HEP because increasing strength of the core and hips along with PFMs have shown to have a positive impact on PFM strength and low back pain.^{56,57} Posttreatment prone assessment of L5 revealed that it had correct alignment with symmetrical posterior arches in the coronal plane. Correction may have occurred upon the pelvic upslip correction or by performing her HEP. Sensation of the right L2-L4 dermatomes improved.



Figure 5. Improved dissociation of the glans from the prepuce with improved exposure of the glans.

During her third visit, she reported having an improvement of her LBP with pain level (2/10) yet complained of left hip pain (3/10) and cervical spine pain (3/10) and no changes in her sexual pain. Assessment of her cervical spine revealed pain and malalignment of the C6 vertebrae. A manual correction of alignment via MET and posterior-anterior mobilizations of C6 to reduce pain were performed.^{58,59} Transvaginal PFM massage was performed for several minutes on each side because the PFMs were still painful to palpation and her sexual pain was still not improved. Because her vulvovaginal pain had increased after her cesarean section and mobility restrictions in the scar and surrounding tissue was noted, cesarean section scar tissue mobilization, including MFR, was performed. MFR techniques were performed to the clitoral prepuce for several minutes. Instruction of isolated transversus abdominis (TrA) contraction exercises for reeducation was performed using rehabilitative ultrasound (RUS) imaging to ensure proper recruitment and understanding of the patient and was issued for another HEP. Recruitment of TrA using a drawing-in maneuver is associated with long-term low back pain reduction.⁶⁰ The RUS abdominal imaging provides feedback for the therapist and the patient in assessing and reeducating the TrA muscle.⁶⁰ The use of RUS to observe the contraction of a muscle in real time has

become a valuable tool especially when the muscles to be assessed for are not readily observable.⁶⁶

At her fourth visit, she complained of left buttock pain and no change in her sexual pain. Thus, addressing her orthopedic complaints became of primary importance. Assessment revealed palpation of the inferior-lateral angle of the left sacrum and piriformis muscle referred pain to her left posterior hip region. Soft tissue mobilization to the left piriformis muscle³⁸ was performed because of its attachment into the sacrum. Mobilization to correct the left sacroiliac joint occurred using an MET with the patient in the supine position.⁵³ The patient's hip is flexed with her thigh vertical and slightly adducted. The therapist's caudal index finger palpates the sacroiliac joint. The therapist's cephalad hand resists force for 7 to 10 seconds from the patient's knee into the hand along a long axis for 3 repetitions. During the relaxation phase, the therapist applies pressure through the knee (femur) toward the sacroiliac joint to evaluate for any increased mobility of spring.⁵³ Prone palpation assessment revealed that the sacral bases were symmetrical in the coronal plane. Soft tissue mobilization to the lumbar/pelvic region and left hip were performed. Lateral distraction and inferior mobilizations were applied to the left hip, which are considered effective treatment techniques in increasing range of motion and decreasing pain and results in increased hip strength.^{67,68} Specific clitoral prepuce MFR was applied for several minutes and the patient was instructed to attempt self-MFR of the prepuce at home. Palpation of the pubic symphysis was very tender; therefore, MFR over her pubic bones was performed. Integrative Manual Therapy bone bruise technique was performed to her pubic bones to resolve the bone bruise sensation.⁵⁸ The bone bruise technique is a series of MFR techniques performed over the site of the bone bruise in a specific manner to improve the bone integrity and reduce pain.⁶¹ A bone bruise is defined as a microtrabecular fracture and feels very sore upon direct palpation.⁶⁹ The patient felt complete resolution of the bruise sensation of her pubis following the Integrative Manual Therapy bone bruise technique.

On her fifth visit, the patient reported that performing her own MFR to the clitoris resulted in stinging and redness for several days. The clitoris appeared less fused on the right side and the redness had apparently resolved. Transvaginal PFM release was performed for several minutes on both sides. Clitoral prepuce MFR was performed for several minutes. The PFM reeducation occurred with the use of RUS transabdominal imaging.⁶² The therapist can more easily assess and retrain the patient for improved voluntary PFM motor control by utilizing this state-of-the-art equipment to visualize and target the correct

muscle recruitment. Digital manual muscle testing of her PFM revealed an increase in strength to 5/5, which confirmed the effectiveness of the use of the RUS transabdominal imaging and likely her compliance with her HEP. There was restored sensation of the left labia majora to light touch.

By her sixth session, she reported having return of clitoral sensitivity upon sexual relations with her husband. She reported pain-free intercourse but without orgasm from clitoral simulation. Treatment consisted of transvaginal PFM massage, MFR to the sacral region and bilateral hamstrings along the path of the sciatic nerves, sciatic nerve mobilizations as per Butler,^{39,40} and clitoral prepuce MFR was performed for several minutes until release was noted. Sciatic neural tension resolved with improved SLR test to 55°. Addressing the nerve tension can possibly reduce her LBP.

The patient was able to perform full (AROM) thoracolumbar lateral flexion bilaterally without pain at her seventh visit. Treatment performed included transvaginal PFM massage, MFR of the lumbo-sacral region, caesarean section scar tissue mobilization, and clitoral prepuce MFR for several minutes until release was noted.

During her eighth session, the patient had primarily LBP rated 2/10 and treatment focused on instructing her how to perform several core stabilization exercises⁵¹ and low back stretching exercises.⁵¹ Motor control exercises of the local stabilizing muscles was administered, which was comprised of low load activation isometrically with the patient in 4-point kneeling or on-all-4s position. Motor control exercises are very effective in reducing LBP and increasing lumbar mobility.⁶⁴ Clitoral prepuce MFRs were performed for several minutes. Transvaginal PFM massage was performed for several minutes on each side.

Her subjective comments during her ninth treatment included having improved LBP to 0-1/10 and she was experiencing pain-free intercourse. She experienced one episode of left-sided vulvar ache post-coital only. Soft tissue mobilization to her lumbar spine was performed. Transvaginal PFM massage was performed for a few minutes on each side and passive bilateral lower quarter stretching for her psoas, piriformis, iliotibial bands, and hamstrings were performed. The motor control low back exercise in the all-4-position as per her last session was repeated. Findings from the Ober Test and Thomas Test for lower quarter flexibility impairments were now negative.

A Cotton Swab Test was performed on her vestibule during tenth visit and remained pain-free for all areas of the vestibule. sEMG biofeedback resting level for the PFMs was performed using the same procedure at the baseline testing and her resting

level improved to 2 (uv). The PFM palpation revealed absent pain in all of the previous painful PFMs for both deep and superficial layers. Her HEP was reviewed. She had achieved her goals of PT and was discharged with instruction to continue her HEP for 2 more months. She was advised to follow up with her gynecologist if her clitoral pain returned or she noted any adherences of the prepuce to glans return.

Outcome

The patient's clitoral prepuce was no longer adhered to the clitoral glans on either side demonstrating 100% improvement of her phimosis (Figure 5). Her clitoral sensitivity improved and she was able to achieve clitoral orgasms intermittently. She indicated intermittent LBP, reduced to 1/10, and only associated with prolonged standing. Her thoracolumbar range of motion was restored to within normal limits. Sensation was restored to the left labia majora and to the right L2-L4 dermatomes. The sciatic neural tension had resolved with no tension noted during a SLR test and equal to the other side. There was full resolution of the pubic bone bruise pain. The persistent vaginal pain resolved and her sitting tolerance was not limited. She was now able to insert a tampon without pain. Tolerance for inserting a tampon is considered a standard outcome measure for vulvovaginal pain referred to as the Tampon Test.⁷⁰ There was full resolution of her PFM pain and her Oxford grading for PFM strength improved to 5/5. Her dyspareunia had also resolved. The patient reported continued symptom resolution upon telephone evaluation at 6 months posttreatment.

DISCUSSION

This is a case report of a woman who presented with clitoral phimosis, dyspareunia, PFMD, pubic symphysis pain, and LBP. The causes of the clitoral phimosis for this patient may be result of the blunt trauma she sustained when her son forcefully rammed his head into her pubic region several years ago. Clitoral swelling may have been an immediate result but over time scar tissue formation caused adherence of the prepuce to the clitoris. An inflammatory dermatosis could be ruled out with more testing such as a biopsy. The initial use of the clobetasol 0.05% prior to myofascial techniques may have improved the treatment outcome. Topical clobetasol is commonly prescribed for vulvar dermatitis issues such as lichen sclerosis.⁶⁵

Through the use of specific MFR techniques to the clitoral prepuce, PT outcomes of improved prepuce mobility, dissociation of the prepuce from the clitoris, improved exposure of the glans, and improved sensitivity of the clitoris were obtained.

There are no other studies discussing the use of MFR for the management of clitoral phimosis or clitoral pain. Schroder et al⁷¹ propose the use of a noninvasive vacuum clitoral therapy device to cause clitoral engorgement and potentially improve sexual function in irradiated cervical cancer patients. The pilot study revealed that using the battery-powered vacuum device on the clitoris for 4 times weekly for 3 months during foreplay and masturbation improved mucosal color, moisture, and vaginal elasticity. In this study, the vacuum device may have acted as a passive MFR device of the clitoral prepuce and caused improved engorgement. Another study by Wurn et al²⁶ evaluated the effectiveness of site-specific manual soft-tissue therapy on women with abdominopelvic adhesions to increase orgasm and decrease dyspareunia. An average of 19.5 hours of manual therapy that addressed biomechanical dysfunction and myofascial adhesions affecting the reproductive organs was performed on 29 women who suffered from infertility or abdominopelvic pain. The 23 patients available for follow-up demonstrated improved posttest scores on Female Sexual Functional Index ($P \leq .003$). Whether specific techniques were performed to the clitoral prepuce in this study was not supported, yet it does support the use of manual therapy as an adjunct or alternative treatment for increasing orgasm and decreasing dyspareunia.

The management of this patient also included interventions to address other musculoskeletal impairments. Musculoskeletal impairments are common findings in women with chronic pelvic pain. In addition to the common neural tension evaluative findings as per Hartmann,²⁷ there are other common orthopedic findings in women with vulvar pain such as pelvic obliquity or unleveling of the ilium, sacroiliac joint dysfunction, pubic symphysis dysfunction, thoracolumbar AROM deficits, abdominal muscle pain, hip flexor dysfunction, and PFMD.^{34,72} All of these areas were examined and the findings were addressed in this case study because clitoral pain can arise from orthopedic issues such as spinal dysfunction or pelvic joint misalignment or pain caused by trauma. Gordon⁸ reported on several cases of clitoral pain associated with spondylolisthesis, and genital or pelvic trauma.

In the present case study, the patient had a history of blunt perineal trauma. Blunt or accidental perineal trauma and other trauma such as pelvic surgery or a pelvic fracture can result in sexual dysfunction, including decreased clitoral sensitivity, clitoral pain, and decreased orgasm.⁸ The clitoris and the skin of the prepuce have the greatest sensitivity and may be the most important structures for sexual sensation.⁷³ Patients with clitoral pain, dyspareunia, and/or a history of pelvic trauma may benefit from a PT

evaluation and specific manual therapy performed by a physical therapist who specializes in women's health and PFMD.

Women with clitoral phimosis frequently complain of psychological trauma caused by the distortion of their vulvar architecture and perceived demotion of their sexuality or femininity. This patient did not report having feelings of a distorted image yet may have also benefited from a psychological assessment.

The limitations of this case report are the lack of use of a validated sexual dysfunction questionnaire and lack of biopsy results to further determine the etiology. Biopsy results would help determine whether this patient would benefit from the continued use of the topical corticosteroid. In addition, because other PT interventions occurred at the same time, it may be difficult to conclude that the clitoral prepuce MFR techniques alone would help resolve the sexual dysfunction.

CONCLUSION

It appears that the specific MFR performed on this patient may have been effective in relieving her clitoral phimosis and restoring ability to achieve orgasm. Improvement in the patient's LBP, pubic symphysis pain, neural tension of the sciatic nerve, PFMD, and sexual function were also evident. A comprehensive orthopedic examination of the lower quarter including spine, pelvic girdle and lower extremities in conjunction with a PFM examination is necessary for patients with sexual pain. Addressing those orthopedic findings along with the findings in the PFM examination will provide the patient with sexual pain with a higher standard of care and potentially lead to better outcomes. The PT management using specific MFR should be considered for patients with mild to moderate clitoral phimosis, clitoral sensitivity problems, and dyspareunia.

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