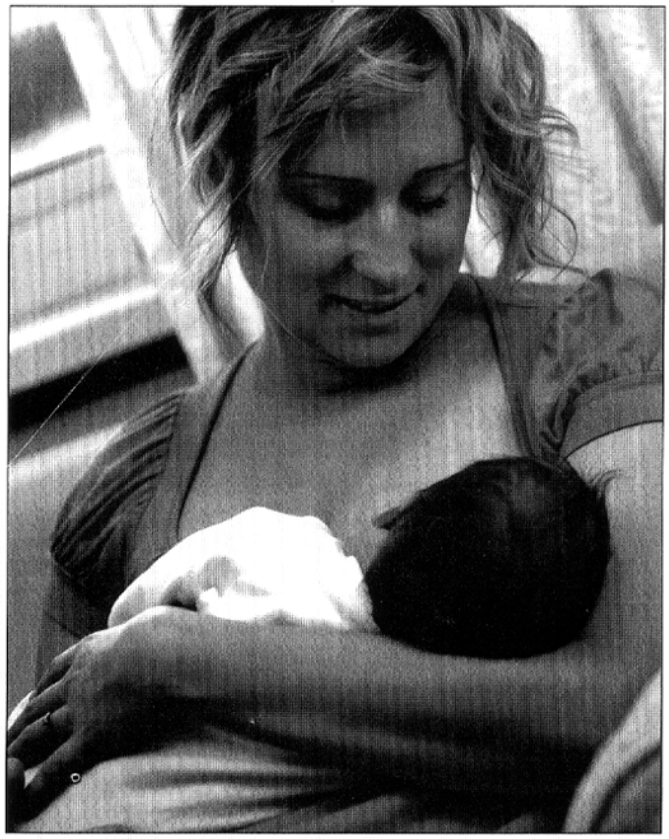

Therapy for Management of Childbirth Perineal Tears and Post-Partum Pain

Pelvic floor manual manipulation with low level laser may be very effective in some post-partum pain patients as described in this case study.

By Isa Herrera MSPT, CSCS;
Luz Perez MSPT; and
Rachel Schneiderman DPT, ATC

Childbirth is a transformative event in a woman's life. The onset of motherhood presents a unique set of physical, emotional and psychological challenges. The post-partum phase can become even more challenging when the new mother experiences perineal or genital tract trauma as a result of childbirth. Gynecological pain imposes physical limitations on the new mother, making child-care, sitting, walking and other activities of daily living (ADLs) extremely difficult and painful.

Perineal tears as a result of childbirth trauma are common with spontaneous vaginal birth.[1] Research has shown that as many as 85% of all women will experience some kind of perineal tearing during childbirth.[1] Lacerations of the perineum are defined and graded according to the structures that have been torn or injured. A classification system (see Table 1) was first described by Sultan[2] and adopted by the International Consultation on Incontinence and the Royal College of Obstetricians and Gynaecologists in 2007.[3]

The most common lacerations in spontaneous childbirth are first- and second-degree tears.[1] Risk factors for genital tract trauma and perineal lacerations include forceps delivery, baby weight over 4000 g, shoulder dystocia, malpresentation of the baby, prolonged second stage of labor, Valsalva pushing and older mothers.[4-9] Third-degree and fourth-degree tears are not as common but are associated with episiotomy.[1] Risk factors for third- and fourth-degree perineal lacerations include the low-squatting birth position, vacuum extraction, median episiotomy and oxytocin augmentation.[10]

Perineal tears are not only a major source of pain for new mothers but they also are associated with increased risk of infection, dyspareunia, urinary stress incontinence, fecal incontinence, anal flatulence, scar tissue, pelvic adhesions, swelling and bruising of the perineum and possible damage to the pudendal nerve.[11,12] In clinical practice, we find that women who experience gynecological trauma during childbirth also report difficulty with prolonged sitting while breastfeeding, pain with walking, pain with positional changes and inability to wear certain types of clothing.

Depending on the severity of the tear, perineal stitching may be required to promote normal tissue healing and function.[13,14] While first-degree tears may either be sutured or left to heal on their own, more severe tears typically require suture repair.[13] Following laceration and repair, scar tissue and adhesions form within the perineum and pelvic floor muscles. Although a normal part of the healing process, scars and adhesions can impede normal pelvic floor muscle strength, flexibility and function. In order to restore control over urination, defecation and sexual function, the resultant perineal scar tissue and pelvic floor muscle strength must be normalized in new mothers.[15]

Therapeutic Modalities

Physical therapists trained in women's health and post-partum care use a multitude of manual therapy techniques to help women regain a pain-free lifestyle after childbirth. Women's health physical therapists incorporate intra-vaginal and intra-rectal pelvic floor muscle stretching, soft tissue massage, scar mobilization, trigger point release, myofascial release and pelvic floor muscle strengthening.

Modalities such as ultrasound and transcutaneous electrical nerve stimulation (TENS) have commonly been used in physical therapy for the treatment of scar, perineal and muscle pain.[16] However, new research has shown that in addition to traditional modalities, low-level laser therapy

Table 1. Classification of Perineal Tears[2,3]

Degree of Perineal Tear	Definition
First-Degree Perineal Tear	Injury to the perineal skin and vaginal epithelium only
Second-Degree Perineal Tear	Involves an injury that extends into the fascia and muscles of the perineum, which includes the deep and superficial transverse perineal muscles and fibers of the pubococcygeus and bulbocavernosus muscles. Second-degree lacerations do not extend into the anal sphincter muscles.
Third-Degree Perineal Tear	Involves an injury through the muscles and fascia of the perineum and involves the anal sphincter complex. Third-degree tears are subclassified further into three categories: 3A: Less than 50% of external anal sphincter (EAS) thickness torn 3B: More than 50% of EAS thickness torn 3C: Both EAS and internal anal sphincter (IAS) torn
Fourth-Degree Perineal Tear	Fourth-degree lacerations involve the perineal fascia and muscles, both the external and internal anal sphincters and the anal epithelium.

Table 2. Healing Effects of Low Level Laser Therapy

- Increases collagen synthesis and promotes wound healing
- Increases macrophage activity
- Enhances leukocyte infiltration
- Increases neovascularization
- Increases fibroblast proliferation
- Promotes early epithelization
- Decreases pain by increasing b-endorphin production
- Blocks depolarization of C-fiber afferent nerves
- Decreases bradykinin levels
- Inactivates trigger points
- Increases nerve potential
- Decreases muscle spasms

(LLLT) can play an important role in the rehabilitation of post-partum women with scar pain, soft tissue injuries, myofascial pain, trigger points and tendonitis.

LLLT is the direct application of infrared light over injured tissue, creating the effect of photo-stimulation in the cell. The emitted light stimulates the cell's mitochondria to become more active and produce more energy in the form of adenosine triphosphate (ATP). This increase in ATP is then used to facilitate the metabolic processes of DNA and RNA synthesis, enzyme synthesis and the synthesis of other products needed to restore balance and homeostasis in the injured cell. The increase in ATP energy production allows the cells and tissues to regenerate, repair and proliferate. The pain and tissue healing properties of LLLT are listed in Table 2.[17-23]

The energy coming out of the laser creates a unique healing opportunity within the tissues. Treating patients with low-level laser light energy adds energy and vitality to targeted injured tissues thus unlocking their healing potential.

The laser used in the following case study was the ML830 by MicroLight Corporation (having three Gallium-Aluminum-Arsenide diodes driven by 30 milliwatts of power) that produced a combined energy output of 3 joules of energy per 33 seconds of treatment time and able to reach tissue depths of up to 5 centimeters with no heat production.[24] This is referred to as a "cold laser" since it produces no heat in the treated tissue. This property allows the laser to be used directly on injured and compromised tissues such as scars, wounds and metallic plates. Since LLLT has minimal side effects, it is an ideal modality for women who are not candidates for pain medication—such as women who are breastfeeding.

LLLT laser has been recently cited in the literature for the treatment of scar tissue. Research by De Paiva et al demonstrated that scars treated with LLLT were more malleable, had 50% lower pain scores and reduced scar thickness compared to the controls.[25]

The following case report describes the successful physical therapy treatment of a patient following surgical repair of a fourth-degree perineal tear. The purpose of this case study is to demonstrate the effectiveness of a conservative treatment approach combined with LLLT for the management of pelvic pain following childbirth perineal tears in post-partum patients. The treatment approach described in this article was developed by the lead author.

Case Study

Patient/Client History

The patient was a 33-year-old Hispanic female who presented status post sphincteroplasty (anal sphincter repair) following the birth of her first child. While delivering in a supported low-squat position, the patient sustained a fourth-degree perineal tear. The attending midwife performed the initial perineal repair.

Ten days following the primary repair, the patient required a secondary repair, performed by an obstetrician/gynecologist. In the months following the revision repair, the patient reported having one-to-three incidents of fecal incontinence per day. To address the fecal incontinence, the patient underwent a sphincteroplasty 20 months following childbirth.

The patient was married with no previous children and no significant past medical history. Prior to childbirth, the patient had been working as an actress and model. The patient's chief complaint during the initial evaluation was rectal pain 10/10 on a 0-10 verbal pain-rating scale, where 0 means no pain at all and 10 means the worst pain possible.[26] The patient also reported bilateral hip pain (pain at 8 out of 10).

In terms of functional limitations, the patient reported pelvic and hip pain with sitting more than 20 minutes, walking, gynecological care, personal hygiene, childcare activities, breastfeeding, defecation and wearing tight clothing, including underwear. The inability to wear tight clothing adversely affected the patient's ability to work as a model. In addition to pain and difficulty with defecation, the patient described incomplete emptying with bowel movements. When questioned about urinary symptoms, the patient reported one-to-two episodes per day of urinary incontinence with coughing and sneezing.

Table 3. Active Range of Motion (pre-treatment)

Motion Tested	Range (in degrees)
Lumbar Flexion	40°
Lumbar Extension	10°
Lumbar Rotation	(B) WNL
Lumbar Side Bending	(B) WNL
Hip Internal Rotation	(R) 40°, (L) 40°
Hip External Rotation	(R) 20°, (L) 25°

Table 4. Manual Muscle Test (pre-treatment)

Muscle Tested	Score	
Abdominal	WNL (no Diastasis Recti)	
Hip Internal Rotation	(R) 2+/5	(L) 2+/5
Hip External Rotation	(R) 2+/5	(L) 2+/5

The patient was asked to describe three goals for her physical therapy treatment. The patient desired to increase the strength of her pelvic floor muscles, to defecate without pain and to achieve pain-free sitting, personal hygiene, self-care and child-care duties.

In accordance with the APTA Guide to Physical Therapist Practice,[27] a review of systems was performed. Gross examination of the integumentary, cardiovascular/pulmonary, musculoskeletal and neurological systems was unremarkable. Following the systems review, a series of tests and measures was performed. The musculoskeletal system was assessed first to rule out orthopedic dysfunction in the lumbopelvic region. An evaluation of the patient's posture revealed a poor sitting posture, with the patient sitting in an excessive posterior pelvic tilt. Upon standing, the patient demonstrated improved posture with a decreased posterior pelvic tilt. Range of motion (ROM) measurements were then obtained for the lumbar spine (see Table 3). While standing, the patient's static balance was also tested and found to be within normal limits (60 seconds in single leg stance bilaterally). The patient was then asked to sit on the treatment plinth. Examination of sacral alignment revealed a left-on-right sacral torsion. Hip rotation ROM and hip rotation manual muscle testing was also measured in sitting (see Tables 3 and 4).

Next, the patient was asked to lie supine on the examination table. Observation of the patient's breathing revealed an upper-chest breathing pattern. Upon instruction of diaphragmatic breathing, the patient demonstrated difficulty coordinating her breath. Neural tension testing revealed negative bilateral straight leg raise tests. Testing of muscle length revealed bilateral piriformis shortening and bilateral positive Ober's tests for iliotibial band contracture.[28] Palpation of the psoas muscle revealed bilateral tenderness, with minimal tenderness found on the right and moderate tenderness on the left. Tenderness was also found upon palpation of bilateral piriformis muscles.

Following assessment of the musculoskeletal system, the patient gave both written and verbal consent for an external and internal pelvic floor muscle examination. According to the APTA Guide to Physical Therapist Practice, dysfunction of the pelvic floor muscles falls under Musculoskeletal Pattern C: Impaired Muscle Performance.[27] The entire physical examination procedure was explained to the patient prior to her signing the consent form.

The patient was placed in a hook-lying position and draped with a sheet. External observation of the perineum revealed a perineal scar and the absence of a perineal body. Asymmetry of the vaginal introitus was also noted, secondary to perineal scar tissue. Next the patient was asked to contract the pelvic floor muscles while the physical therapist observed the movement of the perineum. When performed correctly, a pelvic floor muscle contraction should result in the ventral and cranial movement of the perineum.[29] The patient was able to perform the pelvic floor contraction since an ascent of the perineum was observed. The patient was then asked to relax the pelvic floor muscles, as the therapist again observed the perineum. When asked to relax the muscles, the patient demonstrated difficulty in allowing the perineum to return to its resting position. Voluntary relaxation of the pelvic floor muscles may be documented as absent, partial or complete.[29] The patient described in this case presented with partial voluntary release. Difficulty relaxing or releasing the pelvic floor muscles often indicates spasm of these muscles.[30]

The patient was asked to cough while the perineum was observed for either bulging or lifting. The patient exhibited a lifting contraction with cough, which indicated normal pelvic floor muscle coordination with increased intra-abdominal pressure.[30] According to Messelink et al,[29] the perineum should show no downward movement upon coughing. Next the patient was asked to purposefully contract the pelvic floor muscles and hold the contraction while performing a cough. This task is commonly referred to as the ability to perform the "knack."[30] The ability to perform the "knack" has been shown to correlate with reduced episodes of stress incontinence in women.[30,31] The patient was unable to perform the "knack."

Following the observation of the perineum, digital palpation of the pelvic floor muscles was performed. Digital palpation is used to assess the pelvic floor muscles and surrounding areas at rest, during contraction and during relaxation.[29] Digital palpation is also used to test for pain, as digital pressure may reproduce or intensify a patient's pain.[29] External palpation of the perineum, anal rim and external anal sphincter produced pain rated as 8 out of 10. Mobility of scar tissue may be classified as exhibiting severe hypomobility, moderate hypomobility or normal mobility. Manipulation of the perineal scar tissue revealed severe hypomobility and pain rated as 8/10.

Internal palpation of the pelvic floor muscles may be performed intra-vaginally or intra-rectally.[30] The muscles are palpated in a circumferential manner, with a gloved and lubricated finger.[29] The pelvic floor muscles may be divided into three layers, with each layer located progressively deeper inside the vagina or rectum. Using the index finger as a guide to depth, the first layer corresponds to the first knuckle, the second layer corresponds to the second knuckle and the deeper layer corresponds to the third knuckle (see Table 5 and Figure 1).[32,33]

Due to the patient's history of injury to the anal sphincter, the physical therapist chose to perform the palpation intra-rectally in order to most accurately assess the patient's impairments. The patient was placed in the left sidelying position for the internal assessment. Upon palpation of the pelvic floor muscles, the patient reported a pain score of 6/10 on the right and 7-8/10 on the left throughout all three layers of muscle.

Table 5. Anatomy of Pelvic Floor Layers	
Layer Name	**Main Muscles**
1st Layer: Urogenital Triangle (located first knuckle of the index finger)	Superficial Transverse Perineal Ischiocavernosus Bulbocavernosus
2nd Layer	Sphincter Urethrae Deep Transverse Perineal Compressor Urethrae
3rd Layer	Levator Ani Group • Pubococcygeus • Puborectalis • Iliococcygeus Obturator Internus Ischiococcygeus (Coccygeus)

Table 6. Pelvic Floor Muscle Evaluation (pre-treatment)	
Muscle Evaluation	**Result**
Pelvic floor muscle strength MMT	2/5
Pelvic floor endurance	3 seconds
Pelvic floor muscles voluntary release	Partial
Pelvic floor muscle scar mobility	Severe restriction
Pelvic floor muscle tone	Hypertonic with spasms

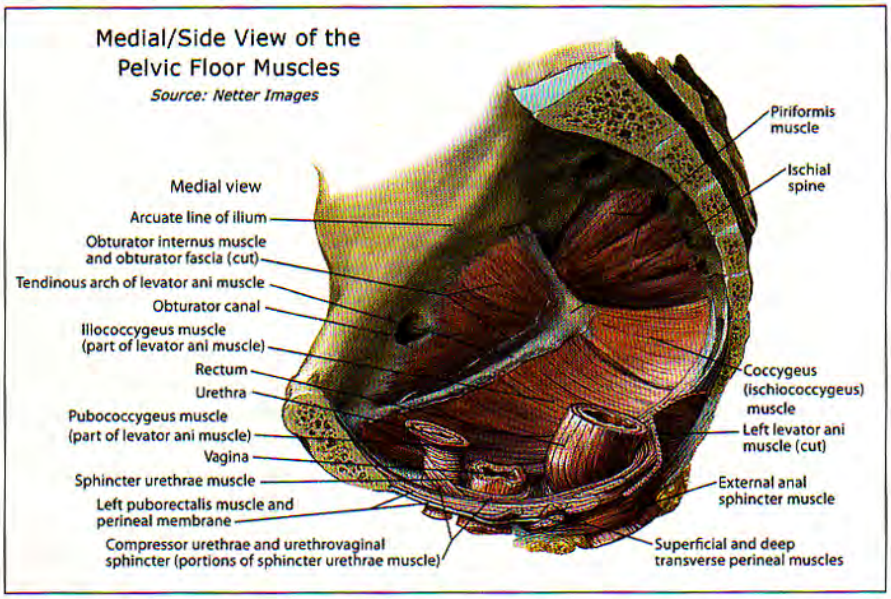

Figure 1. *Medial/side view of the pelvic floor muscles (source: Netter Images. Used with permission).*

The patient was then asked to maximally contract the pelvic floor muscles against the physical therapist's examination finger. Laycock's Modified Oxford Grading Scale was used to grade the strength of the contraction.[30] The patient's pelvic floor muscle strength was graded as a 2/5 (see Table 6). This equates to a weak contraction, without any discernable lift or squeeze.[30]

The muscles were then further tested using the Laycock PERFECT scale.[34,35] The scale has four documented components: power, endurance, repetitions and fast contractions. The last three letters represent the words "every," "contraction," "timed." Two minutes of rest is given between each of the test components.

The power component represents the maximum voluntary contraction (MVC) and is graded 0 to 5, according to Laycock's Modified Oxford Grading Scale.[34,35] As previously described, the patient obtained a score of 2 for her MVC. The endurance represents the time (up to 10 seconds) that the MVC can be sustained. The patient was able to hold her MVC for 3 seconds. Repetition refers to the number of repetitions that the patient can perform at their original MVC and endurance time. The patient was able to perform 10 repetitions of pelvic floor muscle contractions at a maximum strength of 2/5 for 3 seconds each (see Table 6). Therefore, her repetition component was graded as a 10.[34,35] Fast contractions denote the number of one-second contractions that the patient can perform at the originally recorded power.[34,35] In our case, the fast contractions significantly increased the patient's pain and the test was discontinued.

Additional tests for the pelvic floor include electromyography (EMG) with surface- or needle-electrodes.[29] Our patient was evaluated using surface electrodes and a Pathway MR-20 biofeedback unit. The patient's resting baseline was recorded as 15-20 microvolts which, according to the authors' clinical experience, correlates with pelvic floor muscle hypertonicity and spasms.

Diagnosis

The patient was referred by her obstetrician/gynecologist to physical therapy for the treatment of pelvic floor muscle weakness status post fourth-degree perineal tear and three subsequent perineal repairs. The physical therapy diagnosis was "Practice Pattern C: Impaired Muscle Performance."[28] During the initial evaluation the following impairments were found: decreased muscle endurance, decreased muscle strength, decreased muscle length in bilateral hips, severe restriction of perineal scar and decreased ability to voluntarily release pelvic floor muscles.

The physical therapy strategy for this patient consisted of the following clinical and functional goals:

Clinical Goals

- Increase pelvic floor muscle strength to 4/5 in order to decrease fecal and stress incontinence with ADLs and during child-care activities.
- Increase pelvic floor muscle endurance to 10 seconds in order to

increase pelvic stability and prevent re-injury to pelvic floor muscles with lifting, carrying, squatting and child-care activities.

- Achieve normal voluntary release of pelvic floor muscles on manual palpation in order to restore normal muscle length-tension relationship, facilitate voiding and decrease pain (0/10) with gynecological care activities.
- Achieve a resting baseline of 2.0 microvolts on external biofeedback in order to facilitate reduced pelvic floor muscle hypertonicity and increase sitting tolerance in proper postural alignment > 60 minutes.
- Achieve normal mobility of perineal scar tissue in order to facilitate patient's independence with self-care, personal hygiene and gynecological care with decreased pain (0/10).

Functional Goals

- Patient will be able to sit > 60 minutes without increased pelvic pain in order to increase independence with child-care activities, such as breastfeeding.
- Patient will report decreased pelvic and hip pain (0/10) with child-care activities such as lifting, carrying, bending and squatting in order to increase independence and safety with child-care tasks.
- Patient will have pain-free (0/10) bowel movements in order to return to prior level of function.
- Patient will report decreased pain (0/10) during manual internal exam in order to return to prior level of function with gynecological care, self-care and personal hygiene.

The hypothesis of this case was that the patient's pain was a result of pelvic floor muscle spasms secondary to weakness and soft tissue restrictions from post-surgical perineal scarring. This theory was supported by the objective clinical findings during the initial examination that revealed poor voluntary release of pelvic floor muscles, decreased length of hip musculature, decreased perineal scar mobility and decreased pelvic floor muscle strength and endurance.

Intervention

Based on the objective findings of the initial evaluation, the patient was found to be appropriate for the aforementioned physical therapy/LLLT protocol. The plan of care consisted of 13 visits, once per week for a total of 13 weeks including the initial evaluation. At each visit, the patient was treated for a total of 45 minutes. The treatment session consisted of manual therapy, therapeutic exercise, neuromuscular reeducation, scar therapy and modalities such as heat, ice and cold laser therapy for pain management, scar care and inflammation reduction. The clinical prognosis and rehabilitation potential for this patient was determined to be good at the initial visit.

Physical Therapy Initial Evaluation Visit

During the first visit, the patient was educated on the role of pelvic floor physical therapy for post-partum and post-surgical conditions. Information was provided on manual therapy techniques and treatment modalities such as ice, heat, and biofeedback. The patient was also introduced to the cold laser as a treatment modality for pain management and scar care. The benefits of low-level light therapy for scar care and pain management were discussed with the patient including increased circulation, collagen production and restored nerve potential. The patient verbalized understanding.

The patient was then educated on post-partum injury prevention, which included proper biomechanics and ergonomics for child-care activities such as lifting, pushing, carrying and bending. Next, the patient was instructed in how to perform the pelvic brace, a simultaneous abdominal and pelvic floor muscle contraction. The pelvic brace is performed during any effort activity to prevent Valsalva during ADLs and child-care activities.

Patient education continued with instruction on proper defecation techniques to prevent further injury to the pelvic floor muscles. Proper defecation technique includes the use of correct defecation posture, avoidance of straining and pushing, following a voiding schedule and maintenance of a proper diet. The correct defecation posture consists of leaning forward with the elbows supported on the knees and elevating the knees above the hips by using a foot-stool (6-8 inches high). This position allows for opening of the pelvic outlet and easier emptying.[36]

It was determined during the initial exam that the patient had weakness, hypertonicity and trigger points in her pelvic floor muscles causing pain and urinary incontinence with ADLs. As part of a home exercise program, the patient was instructed on "Reverse Kegels" for proper pelvic floor muscle lengthening and relaxation. Internal cues were provided by the therapist's gloved finger and the patient was instructed to use diaphragmatic breathing and visual imagery to relax the pelvic muscles. The patient was also instructed in endurance Kegels for increased pelvic muscle strength and endurance.

Physical Therapy Treatment (Sessions 2-4)

During sessions two through four, the patient reported decreased pain in the pelvic floor muscles during bowel movements at 6-8/10. The patient's resting baseline on biofeedback was measured at 10 mV, a reduction from the resting baseline of 15-20 mV at the initial evaluation. The patient practiced both Kegels and Reverse Kegels while using biofeedback cues.

Trigger point releases of the pelvic floor muscles and scar mobilizations were performed intra-rectally using the therapist's gloved and lubricated finger. The patient reported pain to 7 to 8 (out of 10) with internal palpation of pelvic floor muscles at the first and second layer secondary to scar tissue restrictions affecting mostly the left side.

The patient was instructed on self-mobilization of pelvic floor muscles using an extra small dilator in the rectal canal. The patient was also educated on abdominal rolling, which is a myofascial release technique used to facilitate relaxation and release of the pelvic floor muscles via fascial connections.

The cold laser was then applied externally to the scar for pain relief and accelerated tissue healing. In addition to the perineal scar, LLLT was also used to treat trigger points in the piriformis, bilaterally.

To address restrictions in lumbar and hip mobility, the patient was instructed in specific lower body stretches which are a part of an overall treatment protocol developed by the lead author and include stretches named: figure four stretch, side stretch, side-swipe, goddess, and lumbar stretch.

Self-care techniques included tennis ball release of trigger points in the bilateral posterior hip musculature. Moist

Table 7. Case Study Outcome Measurements Compared to Initial Assessment			
Measurements	**Initial assessment**	**Discharge Assessment**	**Percent Improvement**
Verbal numeric pain scale	10/10	1/10	90% improvement
Pelvic floor muscle endurance	3 seconds	10 seconds	70% improvement
Pelvic floor MMT	2/5	4/5	40% improvement
Pelvic floor muscle tone	Hypertonicity with multiple trigger points	Tone WNL zerotrigger points	100 % improvement
Biofeedback resting baseline	20 microvolts	3-5 microvolts	85-75 % improvement
Perineal scar mobility	Severely restricted	Within normal limits	100% improvement
Pelvic floor musclevoluntary release	Partial voluntary release	Full voluntary release	100 % improvement

heat applied to the gluteal muscles was also recommended for pain reduction at home. The patient was then educated on proper work ergonomics and provided with a handout for appropriate computer workstation setup.

Lastly, the patient was given written and verbal instructions for the completion of a voiding diary, which was returned and reviewed at the third visit. The diary revealed that the patient was emptying her bladder 6-9 times per day, with an average of one to two hours between voids, and experiencing two urinary incontinence episodes per day. The patient was educated on normal bladder function and provided with goals aimed at decreasing voiding frequency and increasing time between voids.

Physical Therapy Treatment (Sessions 5-7)

During sessions five through seven, the patient was able to tolerate more aggressive manual therapy to the pelvic floor musculature. Trigger point release, ischemic pressure and scar releases were performed with good patient tolerance with pain rated 5 to 6 (out of 10). The patient also demonstrated increased ability to release the pelvic floor muscles during diaphragmatic breathing, Reverse Kegels and contract-relax Kegels—using verbal and tactile cues.

The patient began to demonstrate increased bilateral hip mobility and was able to perform the lower body stretches with longer hold times. The patient continued to receive treatment for the posterior hip—including gluteal myofascial release, piriformis trigger point release and deep tissue mobilization.

The patient was instructed in bilateral lower extremity flexion (in D2 PNF pattern) and perineal body release for inhibition of pelvic floor muscle hypertonus. During these sessions, the patient was also able to tolerate increased cycles of LLLT for pain and inflammation reduction at the scar and hip muscles externally.

Physical Therapy Treatment (Sessions 8-10)

During the sessions eight through ten, the patient reported pelvic pain 5 out of 10 with ADLs and child-care activities. At the ninth visit, the patient demonstrated increased pelvic floor muscle strength of 3/5 and increased muscle endurance of 7 seconds. The patient was able to perform four consecutive Kegels at this strength and length of contraction.

On the tenth visit, the patient demonstrated increased pelvic floor muscle endurance of 10 seconds for 5 consecutive repetitions. The patient was able to contract the pelvic floor muscles to a reading of 10 mV and a resting baseline of 2.0 to 7.0 mV.

Hypomobility of the pelvic floor muscles and scar tissue were treated with obturator internus trigger point releases, clock stretches and Thiele's massage. The patient continued to practice Reverse Kegels and contract-relax Kegels with external biofeedback. Low-level laser was applied to the scar tissue and bilateral piriformis muscles for an increased number of cycles without increased pain.

The patient's lower extremity stretches were advanced to include the ankle-to-knee and pigeon stretch. The patient was also instructed in the ball wheel stretch for increased spine mobility.

Lastly, the patient was reminded to use good biomechanics for child care, lifting, bending, and carrying to prevent injury to the core and pelvic floor muscles.

Physical Therapy Treatment (Sessions 11-12)

At sessions 11 through 12, the patient reported decreased incontinence (both fecal and urinary). The patient's external biofeedback revealed a resting baseline of 5.0 during Reverse Kegels and diaphragmatic breathing. The patient demonstrated increased endurance, with 10 second holds at 10 mV. The patient was instructed on "toothpaste Kegels" for increased strength and control with defecation.

The patient reported decreased pain, 4 to 5 (out of 10), with manual therapy to the scar and pelvic floor muscles. The patient also demonstrated significant improvements in bilateral hip range of motion and strength. The patient continued to demonstrate good tolerance to LLLT.

Physical Therapy Discharge (Session 13)

On the last session, the patient reported her pelvic pain as 1 out of 10, a 90% improvement from the initial evaluation. The patient demonstrated increased pelvic floor muscle strength of 4/5, endurance of 10 seconds and normal pelvic floor muscle release. A home exercise program (HEP) consisting of Reverse Kegels, endur-

ance contractions and quick-flick contractions was assigned to the patient.

The biofeedback session showed improved pelvic muscle resting tone at 3.0-5.0 mV. Self-release of the pelvic floor muscles was reviewed as part of the HEP. The patient was instructed to continue with all of the assigned HEP in order to maximize gains in pelvic floor strength and flexibility.

Outcomes

The patient received 13 sessions of physical therapy for post-partum and post-surgical rehabilitation. Upon discharge, the patient reported her pain at 1/10 during ADLs and child-care activities, a 90% improvement from the initial evaluation (see Table 7). The patient's pelvic floor muscle strength and endurance during digital examination increased to a strength score of 4/5 and an endurance of 10 seconds. Resting tone on the external biofeedback was 3.0 mV-5.0 mV, reduced from 20 mV during the initial biofeedback session.

Upon discharge, all clinical and functional goals were met and the patient demonstrated independence with the HEP and self-care instructions. The patient demonstrated improvements in ADL's, child-care activities and increased sitting tolerance. The patient also reported resolution of her urinary and fecal incontinence.

The outcomes of this study clearly demonstrate the effectiveness of physical therapy techniques combined with cold laser therapy in the conservative management of pelvic pain conditions for the post-partum and post-surgical patient.

Discussion

Pelvic rehabilitation following childbirth should represent the standard of care in the United States. In France, women are routinely prescribed physical therapy for regaining pelvic floor muscle strength and function following childbirth.[37] Genital trauma from episiotomy and spontaneous laceration can both result in significant pain and loss of function for the post-partum woman.[1,38] In one study, 22% of new mothers reported perineal pain two months following birth and 10% of new mothers reported pain at 12 to 18 months following birth.[39]

In the United States, many of these women suffer in silence, not knowing where to obtain care. Physical therapists with specialized training in pelvic floor rehabilitation are uniquely equipped to treat conditions of pain and loss of function in the post-partum population.

This case report describes the successful physical therapy treatment of a woman presenting with rectal pain and urinary incontinence following childbirth and sphincteroplasty. By following the lead author's treatment protocol—using a combination of physical therapy techniques and cold laser treatments—the physical therapists were able to return the patient to her pre-morbid level of functional activity.

Conclusion

Genital tract trauma following childbirth results in pain, loss of function and decreased quality of life for many post-partum women. Scar tissue that develops secondary to perineal tearing or episiotomy is often the source of significant pain, muscle weakness and muscle spasms in the pelvic floor muscles. Physical therapists possess numerous techniques that can reduce painful scar tissue and pelvic muscle spasm. In addition to traditional manual techniques, physical therapists can also use pain-relieving modalities such as cold laser.

In the United States, physical therapists are currently underutilized in the treatment of post-partum perineal pain. Women do not need to suffer in silence following childbirth and their caregivers—including obstetricians, gynecologists and midwives—need to see the value of perinatal physiotherapy and refer these women routinely for pelvic floor rehabilitation and scar therapy. ■

Isa Herrera, MSPT, CSCS, is the Clinical Director and Principal of Renew Physical Therapy in New York City and the author of "Ending Female Pain, A Woman's Manual." For more information about Ms. Herrera, please log on to www.Renew-PT.com or www.EndingFemalePain.com.

Luz Perez, MSPT, is a physical therapist at Renew Physical Therapy in New York City with a specialty in women's and men's pelvic floor rehabilitation. For more information about Ms. Perez, please log on to www.Renew-PT.com.

Rachel Schneiderman, DPT, ATC, is a physical therapist at Renew Physical Therapy in New York City with a specialty in women's and men's pelvic floor rehabilitation. For more information about Ms. Perez, please log on to www.Renew-PT.com.

References

1. Albers L, Garcia J, Renfrew M, McCandlsih R, and Elbourne D. Distribution of genital tract trauma in childbirth and related postnatal pain. *Birth*. 1999. 26(1): 11-15.

2. Sultan AH. Editorial: obstetric perineal injury and anal incontinence. *Clin Risk*. 1999. 5: 178-80.

3. Royal College of Obstetricians and Gynaecologists (RCOG). The management of third- and fourth-degree perineal tears. *Green-top Guideline No. 29*. RCOG Press. London. Mar 2007.

4. Albers L, Sedler KD, Bedrick EJ, Teaf D, and Peralta P. Factors related to genital tract trauma in normal spontaneous vaginal births. *Birth*. 2006. 33(2): 94-100.

5. Mikolajczyk RT, Zhang J, Troendle J, and Chan L. Risk factors for birth canal lacerations in primiparous women. *Am J Perinatol*. 2008. 25(5): 259-264.

6. Dudding TC, Vaizey CJ, and Kamm MA. Obstetric anal sphincter injury: incidence, risk factors, and management. *Ann Surg*. 2008. 247: 224-237.

7. Fitzgerald MP, Weber AM, Howden N, Cundiff GW, and Brown MB. Risk factors for anal sphincter tear during vaginal delivery. *Obstet Gynecol*. 2007. 109(1): 29-34.

8. Yildirim G and Kizilkaya B. Effects of pushing techniques in birth on mother and fetus: a randomized study. *Birth*. 2008. 35(1): 25-30.

9. Kearney R, Miller JM, Ashton-Miller JA, and DeLancey JO. *Obstet Gynecol*. 2006. 107(1): 144-149.

10. Jander C and Lyrenas S. Third and fourth degree perineal tears: predictor factors in a referral hospital. *Acta Obstet Gynecol Scand*. 2001. 80: 229-234.

11. Sze EH. Anal incontinence among women with one versus two complete third-degree perineal lacerations. *Int J Gynaecol Obstet*. 2005. 90(3): 213-217.

12. Tetzschner T, Sorensen M, Jonsson L, Lose G, and Christiansen J. Delivery and pudendal nerve function. *Acta Obstet Gynecol Scand*. 1997. 76: 324–331.

13. Fleming VE, Hagen S, and Niven C. Does perineal suturing make a difference? The SUNS trial. *BJOG*. 2003. 110(7): 684-689.

14. Leeman LM, Rogers RG, Greulich B, and Albers LL. Do unsutured second-degree perineal lacerations affect postpartum functional outcomes? *J Am Board Fam Med*. 2007. 20(5): 451-457.

15. Decherney AH, Chang WY, and Marin CM. Preventing adhesions after abdominal myomectomy: tools and techniques. *OBG Management*. 2003. 15(6): 18-37.

16. McLachlan Z. Electrotherapy options for the perinatal period and beyond. In: Sapsford R, Bullock-Saxton J, Markwell S. *Women's Health: A Textbook for Physiotherapists*. WB Saunders Co Ltd. London. 1998. pp 292-300.

17. Ohno T. Pain suppressive effect of low power laser irradiation. A quantitative analysis of substance P in the rat spinal dorsal root ganglion. *J Nippon Med Sch*. 1997. 64(5): 395-400.

18. Tsuchiya K et al. Diode laser irradiation selectively diminishes slow component of axonal volleys to dorsal roots from the saphenous nerve. *Neuroscience Letters*. 1993. 161: 65-68.

19. Schindler A et al. *Increased dermal neovascularization after low dose laser therapy*. 2nd Congress, World Association for Laser Therapy. Kansas City. 1998.

20. Almeida-Lopes L et al. Comparison of the low level laser therapy effects on cultured human gingival fibroblasts proliferation using different irradiance and same fluence. *Lasers in Surgery and Medicine*. 2001. 29(2): 179-184.

(References continued on page 32)

and worked as Resident Medical Officer at the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders. Chowdhury returned to Japan to the Meikai Pharmaco-Medical Laboratory of Meikai University School of Dentistry as a staff researcher in 2004. In June 2006, he joined James Cook University, Townsville, Australia, as academic staff. Since March 2010, he has been working as a Researcher in Pain Management Clinic of the Townsville Hospital of Queensland Health.

Mike Shelley, PhD, BPsych, is the Director of Psychology, for a regional Health Service. His PhD was in health psychology looking at the effects of psychological distress on pain and immunological outcomes for surgical cardiac patients. Mike has been first author on four articles published in peer-reviewed journals in health psychology. Work history includes NGOs, private and public hospitals working in chronic pain, alcohol and drugs, mental health and PTSD. Academic work includes lecturing at Universities in personality, psychopathology, health psychology, research methods, ethics, counseling and organizational psychology. Dr. Shelley's interests include psychological symptoms and heart disease, pain management, health psychology, psychoneuroimmunology, post trauma stress disorder, cognitive decline in the elderly, narrative therapy, exposure therapy, research methods, and teaching. Private practice work includes group therapy on self-awareness, chronic pain, human stress response, relapse prevention, anger management, and trauma—as well as individual psychotherapy and supervision of students.

Petra Buettner, PhD, is an applied biostatistician with a major focus on skin cancer epidemiology. Dr. Buettner is specialized in the quantitative methods in epidemiology and the design and analysis of epidemiological studies, including clinical trials. She has been lecturing quantitative research methodology for post- and undergraduate students for two decades. Dr. Buettner has co-authored more than 150 peer-reviewed journal articles and book chapters.

References

1. Melzack R. Introduction: the pain revolution. In: Melzack R and Wall PD (Eds). *Handbook of Pain Management*. Churchill Livingstone. Edinburgh. 2003. pp 3-6.

2. Breivik H, Borchgrevink PC, Allen SM, Rosseland LA, Romundstad L, Hals EK, Kvarstein G, and Stubhaug A. Assessment of Pain. *Br J Anaesth*. Jul 2008. 01(1): 17-24.

3. Kroenke K. Measuring and distilling the impact of pain. Pain. 2009. 142(1-2): 7-8.

4. Turk DC and Flor H. Chronic Pain: A Biobehavioral Perspective. In: Gatchel RJ and Turk DC (Eds). Psychosocial Factors in Pain. *Critical Perspective*. Guilford. New York. 1999. pp 18 - 34.

5. Ibid, ref 1.

6. Wæhrens EE, Amris K, and Fisher AG. Performance-based assessment of activities of daily living (ADL) ability among women with chronic widespread pain. *Pain*. Jul 2010. [Epub ahead of print]

7. De Gagné TA, Mikail SF, and D'Eon JL. Confirmatory factor analysis of a 4-factor model of chronic pain evaluation. *Pain*. Feb 1995. 60(2): 195-202.

8. Holroyd KA, Malinoski P, Davis MK, and Lipchik GL. The three dimensions of headache impact: pain, disability and affective distress. *Pain*. Dec 1999. 83(3): 571-578.

9. Nelson L and Schwaner R. Transdermal fentanyl: pharmacology and toxicology. *J Med Toxicol*. Dec 2009. 5(4): 230-241.

10. Likar R, Kayser H, and Sittl R. Long-term management of chronic pain with transdermal Buprenorphine: a multicenter, open-label, follow-up study in patients from three short-term clinical trials. *Clin Ther*. Jun 2006. 28(6): 943-952.

11. Turunen JH, Mäntyselkä PT, Kumpusalo EA, and Ahonen RS. Frequent analgesic use at population level: prevalence and patterns of use. *Pain*. Jun 2005. 115(3): 374-381.

12. Gureje O, Von Korff, Simon G, and Gater R. Persistent Pain and Well-being A World Health Organization Study in Primary Care. *JAMA*. 1998. 280: 147-151.

13. Patten SB, Beck CA, Kassam A, Williams JV, Barbui C, and Metz LM. Long-term medical conditions and major depression: strength of association for specific conditions in the general population. *Can J Psychiatry*. Mar 2005. 50(4): 195-202.

14. Moldofsky H. Sleep and pain. *Sleep Med Rev*. 2001. 5: 385–396.

15. Tang NKY, Wright KJ, and Salkovskis PM. Prevalence and correlates of clinical insomnia co-occurring with chronic back pain. *J Sleep Res*. 2007. 16(1): 85–95.

16. Linton JL. The Relationship between Activity and Chronic Back Pain. *Pain*. 1985. 21: 289-294.

17. Robinson ME, Brown JL, George SZ, Edwards PS, Atchison JW, Hirsh AT, Waxenberg LB, Wittmer V, and Fillingim RB. Multidimensional success criteria and expectations for treatment of chronic pain: the patient perspective. *Pain Med*. Sep-Oct 2005. 6(5): 336-345.

18. Call-Schmidt TA and Richardson SJ. Prevalence of sleep disturbance and its relationship to pain in adults with chronic pain. *Pain Manag Nurs*. Sep 2003. 4(3): 124-133.

19. Marty M, Rozenberg S, Duplan B, Thomas P, Duquesnoy B, and Allaert F. Quality of sleep in patients with chronic low back pain: a case-control study. *Eur Spine J*. 2008. 17(6): 839–844.

20. Furlan AD, Sandoval JA, Mailis-Gagnon A, and Tunks E. Opioids for chronic noncancer pain: a meta-analysis of effectiveness and side effects. *CMAJ*. May 2006. 174(11): 1589-1594.

21. School of Psychology University of New South Wales. Depression, Anxiety, and Stress Scales (DASS). www2.psy.unsw.edu.au/groups/dass. Accessed 1/3/2011.

22. Pollard CA. Preliminary validity study of the pain disability index. *Perceptual and Motor Skills*. 1984. 59(3): 974.

23. Gatchel RJ. Perspective on Pain: A Historical Overview. In: Gatchel RJ, Turk DC (Eds). *Psychosocial Factors in Pain Critical Perspective*. Guilford. New York. 1999.

(Perineal Tears continued from page 21)

21. Samoilova KA, Bogacheva ON, Obolenskaya KD, et al. Enhancement of the blood growth promoting activity after exposure of volunteers to visible and infrared polarized light. I. Stimulation of human keratinocyte proliferation in vitro. *Photochem Photobiol Sci*. 2004. 3(1): 96–101.

22. Reddy GK, Stehno-Bittel L, and Enwemeka CS. Laser photo stimulation accelerates wound healing in diabetic rats. *Wound Repair and Regeneration*. 2001. 9(3): 248-255.

23. Stadler I, Lanzafame R J, Evans R, et al. 830 nm irradiation increases the wound tensile strength in diabetic murine model. *Lasers in Surgery and Medicine*. 2001. 28(3): 220-226.

24. Cold Laser Therapy Symposium 2006. Course Manual. American Society of Laser Therapy. 2006.

25. de Paiva Carvalho RL, Alcântara PS, Kamamoto F, Cressoni MD, and Casarotto RA. Effects of low-level laser therapy on pain and scar formation after inguinal herniation surgery: a randomized controlled single-blind study. *Photomed Laser Surg*. Oct 2009. PMID: 19821701. [Epub ahead of print]

26. Howard FM and El-Minawi AM. Taking a History. In: Perry CP, Carter JE, El-Minawi AM, and Li RZ, (eds); Howard FM (Senior ed). *Pelvic Pain Diagnosis and Management*. Lippincott Williams and Wilkins. Philadelphia. 2000. pp 7-25.

27. Magee D. *Orthopedic Physical Assessment, 3rd edition*. WB Saunders Co. Philadelphia. 1997.

28. *Guide to Physical Therapist Practice, 2nd Edition (Revised)*. American Physical Therapy Association. Alexandria, Virginia. 2003.

29. Messelink B, Benson T, Berghmans B, et al. Standardization of terminology of pelvic floor muscle function and dysfunction: report from the pelvic floor clinical assessment group of the international continence society. *Neurourol Urodyn*. 2005. 24: 374-380.

30. Laycock J and Haslem J. *Therapeutic Management of Incontinence and Pelvic Pain*. Springer Publishers. London. 2002. p 244.

31. Miller M, Ashton-Miller K, Carchidi L, et al. Does a three month pelvic muscle exercise intervention improve the effectiveness of the knack in reducing cough induced urine loss on a standing stress test? *Int Urogynecol J Pelvic Floor Dysfunct*. 1997. 8(4): 253.

32. Herman H and Wallace K. *Female Pelvic Floor Function, Dysfunction and Treatment (PF 1)*. Course Manual. 2008. Herman & Wallace Pelvic Rehabilitation Institute. 2008.

33. Herrera I. *Ending Female Pain, 1st edition*. Duplex Publishing. New York, NY. 2009.

34. Laycock J. *Clinical Evaluation of the Pelvic Floor*. Springer Verlag. London. 1994. pp 42-48.

35. Laycock J. Pelvic muscle exercises: physiotherapy for the pelvic floor. *Urol Nursing*. 1994. 14:136-140.

36. Markwell S and Sapsford R. Physiotherapy management of pelvic floor dysfunction. In: Sapsford R, Bullock-Saxton J, Markwell S. *Women's Health: A Textbook for Physiotherapists*. WB Saunders Co Ltd. London. 1998. pp 292-300.

37. Druckerman P. Postpartum impression. *New York Times*. December 13, 2007.

38. Hartman K, Viswanathan M, Palmieri R, et al. Outcomes of routine episiotomy: a systematic review. *JAMA*. 2005. 293(17): 2141-2148.

39. Glazener CMA, Abdalla M, Stroud P, et al. Postnatal maternal morbidity: extent, causes, prevention and treatment. *Br J Obstet Gynaecol*. 1995. 102: 282-287.