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PELVIC FLOOR REHABILITATION

A comprehensive physical therapy approach including visceral manipulation after failed biofeedback therapy for constipation

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Introduction

Pelvic floor rehabilitation encompasses the application of specific therapeutic treatments aimed to improve muscle strength, relaxation, and coordination, promotes circulation, and restores the mobility of the fascial, ligamentous, nervous, vascular, and visceral systems, to foster pelvic health and biomechanics. The following case study will illustrate the importance of this approach to pelvic floor rehabilitation.

Case description

A 41-year-old Caucasian female was referred to physical therapy by a colorectal surgeon for severe constipation, rectal pain, and levator ani spasm. The patient presented with an 8-year history of constipation following a cholecystectomy and a 4-year history of rectal pain following a hemorrhoidectomy. Additional past medical history included a gastric sleeve surgery 2 years ago (resulting in 100 lbs weight loss, now weighing 130 lbs) and three pregnancies with episiotomies. Past treatment included 10 sessions of internal rectal biofeedback and electrical stimulation, incorporating strengthening, resting, and coordination exercises, performed by her physician's medical assistant. Improvement in muscle control was reported, yet bowel function and quality of life remained unchanged. The patient used daily laxative and enemas 2×/month in order to have a bowel movement. She reported occasional bright red rectal bleeding associated with defecation. She drank 4–6 glasses of water daily, her fiber intake was 15 g/day, and she did not participate in an exercise regimen. No medication associated with constipation side effect was reported.

Other relevant symptoms included straining with bowel movement 75 % of the time, difficulty emptying fully and hard stool 25 % of the time, and an average of 15 min in a lavatory in an attempt to defecate. She had difficulty initiating urination 10 % of the time, especially when feeling constipated. She reported on a modified analog scale, abdominal pain with passing of gas and urge to defecate 3–5/10, rectal pain with defecation 5–7/10, and suprapubic pain with full bladder and dysuria 3/10. She described her pain as sharp, stabbing, aching, cramping, and throbbing.

The Bristol scale stool form fluctuated between types 2, 3, and 4. She reported five out of seven symptoms of the Rome III criteria for chronic idiopathic constipation. The constipation scoring system was 11/30. The patient assessment of constipation-symptoms (PAC-SYM) was 16/48. The patient assessment of constipation-quality of life (PAC-QOL) was 40/112.

Diagnostic imaging and studies

Medical imaging included a normal colonic transit study, ruling out slow-transit constipation. The defecography (Fig. 1) study showed diminished anal sphincter relaxation, no significant rectocele, intussusception, or enterocele was defined while straining. The anorectal manometry study revealed decreased first rectal sensation (50 ml) and unsuccessful balloon expulsion. The findings were suggestive of anal dyssynergia.

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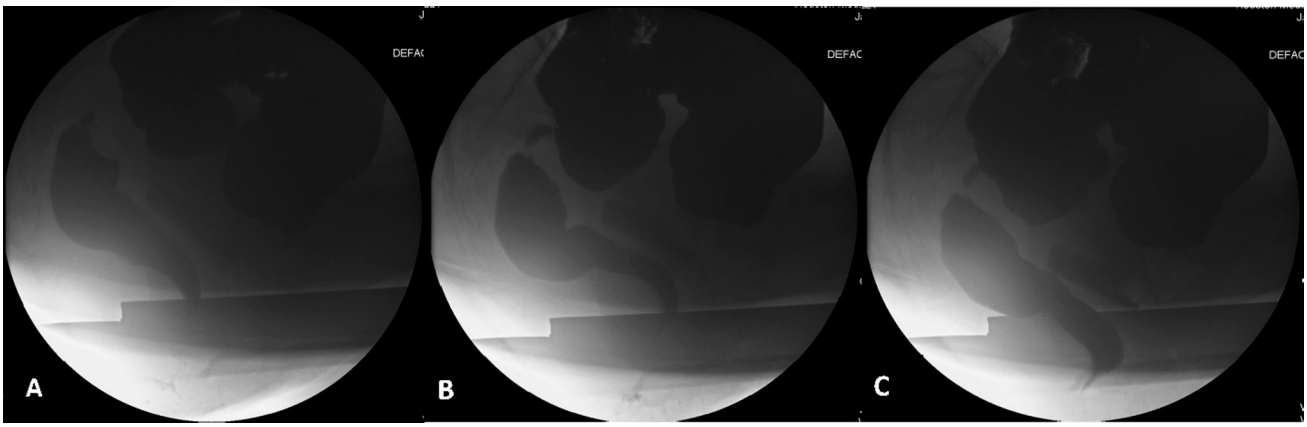

Fig. 1 Patient case defecography. Patient defecography: **a** at rest, **b** during pelvic floor muscle contraction, **c** during defecation. Normal perineal excursion is visible (**a**, **b**). With straining, decreased perineal descent with diminished anal sphincter relaxation, no significant rectocele, or rectal prolapse is defined. The patient was unable to evacuate under observation (**c**)

Physical therapy examination

The evaluation began with a standard lower quadrant assessment, observing posture, range of motion, strength, flexibility, thoracolumbosacral alignment, and mobility. The patient displayed a kyphotic posture, as well as vertebral asymmetry and hypomobility of the thoracolumbar spine at the level of T10 to L4. She also showed decreased hip external rotation to the right and hamstrings tightness bilaterally. Research indicates that impaired spinal mobility and associated chronic pain may contribute to possible changes in the autonomic functions of the viscera [1–3]. In addition to the standard spinal joint assessment, the patient was asked to flex and extend the lumbar region in sitting as the therapist palpated the coccyx motion. Coccyx motion may be restricted by severe spasm of the levator ani and coccygeus muscles. External musculature was assessed demonstrating spasm of the left iliopsoas, the left gluteus medius, and the right coccygeus.

Neurological examination

Neurological examination included testing for reflexes, upper motor neuron signs, and peripheral nerve mobility. Barral and Croibier describe the vicious circle of nerve compression, creating an increase in intraneural pressure, and decreased venous and lymph flow which lead to intraneural edema. This repetitive cycle of nerve irritation can create pain and nerve fibrosis with scar tissue formation [2]. Increased pudendal nerve terminal motor latency from straining has been associated with constipation and incontinence [4]. Also, pudendal neuropathy may be caused by spasm of the piriformis, obturator, levator muscle, as well as compression from the sacrospinous and sacrotuberous ligaments. Pelvic floor therapists are trained to manually detect nerve entrapment by eliciting tenderness in specific the areas of the nerves based on anatomical references. The pudendal nerve first anatomical site is externally palpated at the exit point lateral to the sacrum inferior to the piriformis with the patient positioned side-lying. The therapist is facing the patient and applies gentle compression to the nerve with bilateral finger pads of the second and third fingers. The second point of assessment is palpated transrectal or transvaginally in the supine position inferior to the ischial spine, and the third point is palpated medial to the ischial tuberosity, exiting the Alcock's canal. The therapist locates the ischial spine and then glides the index finger inferior. The pulse of the pudendal artery can aid ascertain the position of the nerve as they travel in juxtaposition. Lastly, the index finger glides along the ramus following the path of the Alcock's canal, and a medial and superior elongation is performed medial to the ischial tuberosity as the nerve emerges from the canal. This patient was found to have signs of entrapment at the left Alcock's canal.

Visceral and abdominal examination

Decreased arterial and lymphatic flow may be caused by adhesion and scar tissue formation resulting from abdominal surgery, trauma, and inflammatory processes [5, 6]. The aortic pulse is palpated at different levels. A diminished amplitude, a strong increase in pulse, and/or an erratic rhythm can be signs of circulatory dysfunction. Decreased abdominal visceral and fascial mobility can also be a contributing factor to patient's pain, muscle dysfunction, and bowel abnormalities [1, 5, 6].

Two main visceral components evaluated are the motility (i.e., free range of motion) and mobility (i.e., how much an organ can be displaced) of an organ. For example,

the mobility of the sigmoid is tested by applying a superior traction of the sigmoid toward the umbilicus, placing the finger pads lateral to the psoas muscle, approximately 4 cm from the inguinal canal [1]. The patient had undergone two abdominal surgeries, and decreased motility of the small intestine, restriction, and decreased mobility of the sigmoid were felt.

Perineal examination

The evaluation was performed in a supine position with the knees bent. External palpation revealed spasm of the left transverse perineum. Perineum excursion was then assessed by asking the patient to perform a pelvic floor contraction or Kegel and subsequently a bearing down maneuver. Minimal excursion of the perineum was present which may be a sign of pelvic floor weakness, spasm, or a combination of both. The perineal reflex was normal, sign that the pudendal nerve was intact.

The intravaginal pelvic floor muscle strength was recorded according to the Laycock's modified Oxford grading system 0–5/5 [7]. The pelvic floor endurance was assessed through sustained pelvic floor contraction. The strength of the levator ani and external anal sphincter was slightly decreased and graded 4–/5, and she was able to maintain a seven second contraction on endurance. The patient was then asked to bear down to rule out organ prolapse. No rectocele was detected. The pelvic floor musculature, including the obturator internus, coccygeus, and levator ani, was palpated bilaterally for trigger points, hypertonicity, tenderness, and tone [6]. Spasm of the right coccygeus and bilateral levator ani muscles were recorded. A decreased mobility of the left side of the urethra and the right side of the rectum was noted.

The rectal examination was performed with the patient in a lithotomy position. Burning pain during the digital rectal examination and adhesions from scar tissue was noticed. The defecation mechanism was then evaluated by asking the patient to bear down while contracting the transversus abdominus. Rectal dyssynergia was confirmed with the inability to relax fully the external anal sphincter while bearing down. The vaginal and rectal canal was also assessed in a seated position to account for the effects of gravity (Fig. 2). She was asked to bear down and a partial intrarectal occlusion was felt, which may be indicative of a low-grade intussusception or internal rectal prolapse.

Final assessment

The patient presents with signs and symptoms consistent with obstructed defecation syndrome secondary to pelvic floor dyssynergia. Pain and muscle spasm may be also secondary to scarring from the hemorrhoidectomy. These

Fig. 2 Seated digital rectal and vaginal pelvic floor assessment. The patient is seated on a bedside commode; the therapist sits on the floor and inserts bilateral index fingers into the rectal and vaginal canal. The patient is asked to bear down to assess the rectal mobility (rectocele, rectal prolapse)

impairments may be addressed by incorporating transrectal/transvaginal myofascial release in combination with the anal dilator protocol. The decreased visceral mobility may be contributing to her abdominal bloating and pain and can be treated with visceral and nerve manipulation techniques. Treatment goals were the following:

1. Improved ability to relax the external anal sphincter during bearing down
2. Decreased pain with bowel movement
3. Decreased abdominal bloating and related pain with urination

Intervention and outcome

Behavioral modifications

Behavioral modifications included as part of the home program consisted of posture retraining and nutritional guidelines, increased physical activity, self-bowel massage [8, 9], as well as modification of defecatory habits, positioning, and mechanics, to aid relieve symptoms of constipation. She was recommended to progressively increase her daily high-fiber food and water intake. Changes in bowel and pain patterns that could be associated with potential food intolerance were also recorded by the patient. Daily self-bowel massage by applying upward half circle pressure following the path of

the colon, as well as finger walking around the navel area, was prescribed [8]. Proper bowel habits, such as utilizing the peristaltic wave, not delaying defecation once urge is felt, taking sufficient amount of time (5–10 min) for defecation to prevent straining, and the use of proper defecation mechanics was taught. The patient was instructed to sit on the commode with the hip flexed less than 90°, to create a decrease in the anorectal angle, providing ease of evacuation. The patient was instructed on vibration and dilation therapy to treat hypertonicity and stenosis, respectively. The vibrator was applied vaginally to the levator ani five minutes bilaterally, and the dilator was inserted into the rectal canal ten minutes daily. She was encouraged to visualize pelvic floor relaxation while performing breathing exercise in order to normalize muscle tone.

Therapeutic exercises

Daily therapeutic exercises were prescribed to promote pelvic floor lengthening and core muscle strengthening necessary during defecation. The stretching exercises included the "dead bug," hip flexors, hamstrings, gluteal, and piriformis stretches. The strengthening program used to activate the core muscles included the plank and bridging exercises with dissociation of the pelvic floor muscles. For example, the patient was asked to perform a bridge activating the transversus abdominus and pelvic floor muscles. Then, while maintaining the bridge pose the relaxation of the pelvic floor muscles was performed, to improve coordination and facilitate co-contraction/relaxation.

Manual therapy

Visceral manipulation (i.e., manual mobilization) of colon, sigmoid, small intestine, rectum, kidney bladder, and urethra was carried out. Manipulation of the pudendal nerve was performed intravaginally by applying delicate elongated traction along the nerve as it exits the Alcock's canal, until relaxation was felt. Lymphatic drainage of the perineum was applied through light rhythmical upward motion guided toward the groin area. Spinal mobilization of the thoracolumbar region was applied posteroanterior in a prone position. Intravaginal and intrarectal pressure on trigger points and myofascial release of the levator ani and EAS was also incorporated [10].

Neuromuscular reeducation

Neuromuscular reeducation included pelvic floor contract relax techniques with co-contraction of the transversus abdominus. The patient was asked to contract the pelvic floor musculature and engage the transversus abdominus. She was then asked to gently bear down with the use of the abdominals while releasing the pelvic floor musculature. During the pelvic floor relaxation phase, digital vaginal pressure point to the puborectalis bilaterally guided the pelvic muscle through relaxation.

Outcome

The patient attended seven treatment sessions over 3-month period. Her rectal pain with defecation decreased to 1–2/10, pain with urination resolved, she decreased Miralax use by 50 %, and she did not require the use of water enema. She reported normal stool formation and no straining with defecation. The validated questionnaires were completed a year following physical therapy discharge. The constipation scoring system remained unchanged. The PAC-SYM was reduced by five points, and more importantly, the PAC-QOL was reduced by 20 points.

This case exemplifies a comprehensive physical therapy evaluation and treatment process recommended for evaluating constipation and reinforces the importance of a comprehensive whole-body approach when treating constipation. Assessing the behavioral aspect, the nutritional component, and the multiple systems involved in the defecation and constipation process is primordial to attain the best possible outcome.

From clinical experience, visceral manipulation is a useful intervention in the treatment of constipation. This innovative gentle manual therapeutic technique assesses organ motion and aids in correcting abnormal movement patterns of the affected organs, in relationship to their attachments to the surrounding fascia. Only few studies have evaluated the effectiveness of visceral manipulation involving pelvic floor dysfunctions [11, 12]. Biofeedback also has shown to be a modality of choice in pelvic floor rehabilitation. However, in the case presented the implementation of manual physical therapy concomitant with biofeedback, sensory retraining, and electrical stimulation would probably have been ideal.

The treatment of defecatory disorders requires a multidisciplinary team approach. A thorough assessment by physicians including gastroenterologists and/or colorectal surgeons, physical therapists, dieticians, psychotherapists, and nursing should be part of a comprehensive constipation management program. Additional clinical trials are needed to validate the efficacy of physical therapy as a central role in a whole-body and multimodal approach in the treatment of constipation, as well as exploring patient's compliance, and the cost–benefit ratio of conservative treatment.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Statement of human and animal rights All applicable international, national, and/or institutional guidelines for the care and use of animals were followed.

Informed consent Informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

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