Journal of Gynecology and Maternal Health

ScitechJournals

Open Access

Physical Therapy for Hypertonic Pelvic Floor in Women: Paradoxical Puborectalis Syndrome: A Narrative Review Article

Abstract

Hypertonic pelvic floor dysfunction is an umbrella term for a variety of pelvic floor disorders like Paradoxical Puborectalis Syndrome, Pudendal neuralgia, Vaginismus, vulvodynia, Pelvic floor trigger points, and Dyspareunia. Paradoxical Puborectalis Syndrome (PPS) is a condition characterized by spasms in the pelvic floor muscles, specifically noted as a subtype of dyssynergic defecation. In PPS, the Puborectalis muscle either contracts paradoxically or does not relax properly during attempts to defecate, preventing the anorectal angle from straightening and causing outlet obstruction. Physical Therapy for hypertonic pelvic floor dysfunctions can help overcome symptoms and improve the quality of life for women who complain of these dysfunctions. Assessment tools like the MyotonPRO device and EMG Biofeedback are valid, reliable, and objective methods. The rehabilitation program includes stretching exercises, relaxation training, and electrophysical agents like EMG Biofeedback, Magnetic stimulation, LASER, Extracorporeal Shockwave Therapy, and Pulsed Shortwave Diathermy may be the first-line approach in conservative management of such dysfunctions. This narrative review draws attention to the potential benefits of Physical Therapy management for Paradoxical Puborectalis Syndrome, one of the debilitating hypertonic pelvic floor dysfunctions in women. So, it may be helpful for different Women's Health specialties.

Keywords

EMG biofeedback • Functional constipation • Hypertonic pelvic floor • MyotonPRO device • Paradoxical puborectalis syndrome • Pelvic physical therapy

Research Article

Mohamed G. Ali[1*] and Rehab S. Mamoon[2]

[1]Department of Physical Therapy for Women's Health, Faculty of Physical Therapy, South Valley University, Qena, Egypt

[2]Department of Physical Therapy for Women's Health, Faculty of Physical Therapy, South Valley University, Qena, Egypt

***Correspondence:** *Mohamed G. Ali, Department of Physical Therapy for Women's Health, Faculty for Physical Therapy, South Valley University, Qena, Egypt, E-mail: dr_m.gamal1987@svu.edu.eg*

Received: 14 June 2024; **Accepted:** 25 July 2024; **Published:** 10 August 2024

Introduction

The pelvic floor is composed of several muscles, which are organized into superficial and deep muscle layers [1]. The Puborectalis muscle is a deep pelvic floor muscle that acts like a sling, encasing the urethra, vagina, and rectum. It is located immediately superior to the external anal sphincter [2]. Hypertonic pelvic floor dysfunctions are not widely known. Unlike hypotonic pelvic floor disorders resulting from relaxed muscles, such as fecal incontinence, urinary incontinence, or pelvic organ prolapse, which are often easily identified, women with hypertonic pelvic floor dysfunction may exhibit a wide array of nonspecific symptoms. These symptoms can include pain and difficulties with defecation, urination, and sexual function, all of which necessitate the relaxation of pelvic floor muscles [3]. Paradoxical puborectalis Syndrome (PPS), also known as Anismus, is characterized by the abnormal contraction

of the puborectalis muscle rather than relaxation during defecation [4]. This prevents the normal evacuation of feces and inhibits the anorectal angle from opening properly **[5]**. The anorectal angle is the angle between the posterior wall of the distal rectum and the central axis of the anal canal. It typically measures between 108° and 127° at rest, increases by 15° to 20° during defecation, and decreases by 15° to 20° during squeezing [6,7]. PPS may be associated with propagated perineal descent. Both PPS and perineal descent are types of obstructive defecation. These conditions frequently occur together, complicating their evaluation, diagnosis, treatment, and quality of life [8].

Prevalence

PPS is a prevalent cause of chronic functional constipation among patients with evacuation disorders, with an estimated prevalence ranging from 27% to 59% in these specific patients [9].

Pathophysiology of PPS

PPS or Dyssynergic defecation results from various abnormalities, including obstetric or back injuries, rectal hyposensitivity due to pudendal nerve injury, faulty toilet habits, dysfunction of the gut-brain axis, painful defecation, improper learning of the defecation process during childhood, excessive straining, involuntary anal spasms during defecation, loss of inhibitory neurons in the anal canal muscles, and posture abnormalities, abnormal coordination between abdominal and pelvic floor muscle as in some neurological disorders like extrapyramidal lesions and spinal cord injuries [10,11]. Anxiety and psychological stress can also contribute to the development of PPS by increasing skeletal muscle tension [12].

Signs and Symptoms of PPS

Persistent constipation (fewer than 3 bowel movements per week), the need to manually assist defecation, Tensmus: feeling of incomplete bowel emptying, prolonged and strenuous straining with firm stool, abdominal discomfort [13], and Flatulence [12].

Physical Therapy Examination of the Female Pelvic Floor:

Modified Oxford Grading System: While maintaining the patient's privacy, the Physical Therapist introduces gloved index and middle fingers inside the patient's vagina and ask the patient to perform a maximal voluntary contraction. Modified Oxford Grading System is a reliable but subjective assessment tool [14]. The grading scale consists of the following:

Grade 0: No active muscular contractions

Grade 1: Very slight flicker contractions

Grade 2: Weak squeeze with no lift

Grade 3: Fair squeeze with a lift

Grade 4: Good squeeze with a lift

Grade 5: Strong squeeze with a lift [15].

Perineometry: Perineometry employs a pressure-sensitive device to monitor pressure variations in the pelvic floor which provides both sensory and visible feedback to the patient. Studies have demonstrated its efficacy in evaluating pelvic floor muscle function and detecting issues such as hypotonic or hypertonic pelvic floor like PPS [16].

Electromyography: EMG serves as a reliable and objective evaluation technique for monitoring muscle tone at rest, assessing muscle strength and endurance, and gathering data on both normal and abnormal functions of the pelvic floor muscles [17]. EMG measures the electrical activity produced by the depolarization of muscle fibers, reflecting the voltage effect over time. It represents the combined signals detected within a specific area and serves as an indirect measure of muscle strength. This electrical activity can be captured using either surface electrodes placed on the perineum to record from the superficial pelvic floor muscles or intramuscular (needle) electrodes inserted directly to record from the deep pelvic floor muscles [18]. In some countries, Needle EMG may need a certificate for physiotherapists.

The MyotonPRO Device: Recently, the MyotonPRO, a portable and non-invasive device developed for measuring muscle mechanical properties, has demonstrated strong clinical applicability and proven validity [19], along with reliability [20], across various contractile and non-contractile tissues and conditions [21,22]. Concerning

pelvic floor muscles, the reliability of MyotonPRO assessments is high among adult women, both with and without vulvodynia [23]. Also, there is a relative reliability of the pelvic floor's elasticity, tone, and stiffness using the MyotonPRO device is considered good to excellent for women with urinary incontinence and those who are healthy [24]. The MyotonPRO device measures muscle tone or frequency (F), stiffness (S), elasticity or decrement (D), relaxation time (R), and creep (C) [25].

Electromyography (EMG) Biofeedback: EMG biofeedback offers real-time feedback on pelvic floor muscle activity, helping patients in mastering control and coordination of muscle contractions. Research substantiates its effectiveness in enhancing pelvic floor muscle function [26]. It is a mind-body technique that utilizes visual or auditory feedback to assess and treat various pelvic floor conditions characterized by either hypertonia or hypotonia [27]. EMG Biofeedback evaluation is a painless process that uses surface electrodes and/or special sensors in a vaginal or rectal probe to capture the electrical activity of the superficial or deep pelvic floor muscles, which is displayed on a screen monitor.

Elastometers: The Elastometer was developed to evaluate the passive forces of the pelvic floor muscles. Its system includes a handpiece with two aluminum branches and detachable acetyl plastic speculum tips, a real-time controller, and a laptop computer. It applies controlled stretch at a constant speed to the pelvic floor muscles in a transverse direction to assess their passive properties [28].

3D/4D Transperineal Ultrasonography: Innovative Ultrasonographic techniques provide a non-invasive method to visualize and examine pelvic floor anatomy and function during rest and contractions. Research has shown the effectiveness of 3D/4D ultrasound in diagnosing pelvic floor disorders and assisting in treatment planning **[29]**.

Magnetic Resonance Defecography: Magnetic resonance (MR) defecography has developed into a crucial tool for assessing pelvic floor disorders [30]. Physical Therapists who provide primary care in direct access clinics can order and refer for advanced diagnostic tools like MRI [31] and can interpret its findings. MR Defecography identifies structural and functional abnormalities in patients with clinically suspected PPS. Some of these findings help diagnose PPS [32]. The H and M lines serve as reference lines for the pelvic floor in imaging studies, aiding in the detection and grading of pelvic floor prolapse in defecography assessments. The H line is drawn from the inferior margin of the pubic symphysis to the posterior aspect of the anorectal junction. It represents the diameter of the levator hiatus, with a normal value being less than 6 cm. While the M line is drawn perpendicularly from the posterior end of the H line to the pubococcygeal line. It represents the descent of the hiatus, with a normal value being less than 2 cm [33]. Evaluation should be done through the following 4 phases: during rest, pelvic floor contraction (squeeze), the Valsalva maneuver (strain), and evacuation (defecation) [34].

Treatment of Female PPS: Surgical approaches targeting PPS such as Colostomy, Ileostomy, and Partial division of the Puborectalis muscle should be offered after the failure of conservative approaches like Biofeedback and Botox injection. On the other hand, conservative treatment like Biofeedback therapy is considered the treatment of choice and should be offered initially **[35]**. Botulinum toxin type A (BTX-A) injection blocks Acetylcholine at the neuromuscular junction to provide temporary muscle paralysis and can be considered as an additional effective conservative approach for Female PPS **[36]**.

Physical Therapy Treatment for Female PPS

Electromyography (EMG) Biofeedback: In patients with PPS (Dyssynergic defecation), the aims of neuromuscular training are first to correct the dyssynergia or incoordination of the abdominal, rectal, puborectalis, and anal sphincter muscles to achieve a normal and complete evacuation. Second to enhance rectal sensory perception in patients with impaired rectal sensation [37]. For hypertonic muscles as in PPS, the therapist should begin with electrodes closely spaced and sensitivity set low to minimize cross-talk. The therapist instructs the patient to relax, using deep breathing or visual imagery to help lower the audiovisual signal by utilizing an anal probe or 3 surface electrodes on the perineum. As the patient's motor control improves, the therapist gradually increases the sensitivity.

A large component in the development of PPS is behavioral. The randomized controlled trial by Simon et

al., [38] concluded that in elderly female patients with chronic constipation due to PPS, behavioral treatment with EMG biofeedback (45-minute sessions, twice weekly for 4 weeks) significantly decreased evacuation difficulty and pain during defecation. Additionally, the treatment resulted in notable improvements in weekly defecation frequency and reduced the mean EMG activity of the external anal sphincter during straining. These clinical gains were maintained at the 6-month follow-up.

Posterior Tibial Nerve Stimulation (PTNS): PTNS is a type of peripheral neuromodulation that modulates the ascending neuronal pathways to the cortex at the subconscious level [39]. Transcutaneous PTNS uses electric current, a continuous waveform with a frequency of 10 Hz, and a pulse duration of 200 μs for 30 minutes, three sessions weekly for six months. This method has been effective in treating patients with PPS. The combination of PTNS and biofeedback therapy can enhance positive outcomes in these patients. For bilateral placement of the electrodes, the cathode is positioned behind the medial malleolus, and the anode is placed 10 cm proximal to the cathode on the medial side of the leg [40].

Spinal Magnetic Stimulation: Magnetic fields increase the motion of ions and electrolytes in the tissues and fluids of the body, thereby helping to regain the resting membrane potential of the cells. According to the study of Wang and Tasi., 2012 **[41]**, Spinal Magnetic Stimulation involves placing a magnetic coil at the T9 spinal process for 10 minutes of thoracic nerve stimulation, followed by placing the coil at the L3 spinal process for another 10 minutes of lumbosacral nerve stimulation. The stimulation intensities were set at 50% of maximal output (2.2 Tesla), 20 Hz, with one session daily for 12 sessions. This method may benefit elderly patients with severe constipation associated with pelvic floor dysfunctions.

Stretching Exercises for Pelvic Floor Muscles: Prolonged stretch inhibits muscles by stimulating the Golgi tendon organ reflex. Pelvic floor muscles can be stretched by crossed sitting position, squatting position, and Knee to chest position. Squatting position helps in straightening the anorectal angle [42]. A defecation Postural Modification Device was developed to replicate the alignment achieved with squatting while using a toilet positively influenced bowel movement duration, straining patterns, and complete evacuation of bowels in this study, and it offers a non-pharmacologic option for those individuals who suffer from inadequate bowel emptying or increased straining [43].

Other low-evidence-quality Physical Therapy Treatments: Low-level evidence from opinions of pelvic health physical therapists may also be considered in PPS rehabilitation, including relaxation training and psychological support. Techniques such as Maitland PA sacral glide grade 1 or 2 can assist in reducing pelvic pain associated with pelvic heaviness. Pulsed shortwave therapy on the perineum and sacrum may provide a deep thermal effect (3-5 cm penetration depth) that helps relax spastic muscles. Manual pelvic floor techniques, like ischemic compression and dry needling, may help reduce the sensitivity of pelvic floor trigger points found in PPS patients. Additionally, low-intensity shockwave therapy and low-level laser therapy may be beneficial in reducing Puborectalis muscle spasm and its painful trigger points.

Important Notes Regarding PPS Management: Biofeedback is the treatment of choice for constipated patients with PPS or Dyssynergic defecation. Targeting the underlying cause of PPS is very important for its prognosis, especially in neurological cases. Pulsed magnetic therapy devices typically utilize magnetic influx energy of less than 0.4 Tesla. However, pulsed magnetic stimulation devices, such as those used in the study of PPS, usually utilize magnetic influx energy of around 1 Tesla or more.

Methods

A literature search on 13-14 July 2024 was carried out across multiple academic databases, including Google Scholar, PubMed, the American Physical Therapy Association (APTA) database, the Physiotherapy Evidence Database (PEDro), and the Cochrane Library to guarantee coverage of the latest research on Physical Therapy management for PSS in women. To carry out the search strategy, the authors used keywords such as “Paradoxical Puborectalis Syndrome,” “Dyssynergic Defecation,” “Pelvic Floor Muscles,” “EMG Biofeedback,” “Pelvic Physical Therapy,” and “MR Defecography.” Additionally, relevant conference proceedings were reviewed to identify new studies and innovations not yet published in expert-reviewed journals. Academic-relevant textbooks were also consulted during the search strategy.

Research needs

This review article has discussed Physical Therapy management for a female hypertonic Pelvic Floor dysfunction; Paradoxical Puborectalis Syndrome. However, it did not answer the details about statistics on the incidence of PPS in women and the prevalence of PPS between men and women. Also, demographic factors influence this condition (e.g., age, race, childbirth history). There is a lack of impact of PPS on quality of life and daily activities. Future studies regarding potential new treatment approaches under investigation, the role of telehealth and remote monitoring in pelvic floor therapy, and implementing patient education in such cases should be addressed to provide a comprehensive overview of the current state of knowledge and practice in Physical Therapy (PT) for PPS in women.

Conclusion

This narrative review article focuses on PT management for hypertonic pelvic floor dysfunction, specifically PPS in women. PT management encompasses both examination tools and therapeutic interventions. For these diagnostic and rehabilitative interventions to be effectively assimilated into clinical practice, women's health PTs must be highly qualified and well-trained to assist their PPS patients. Future research should concentrate on long-term outcomes and the comparative effectiveness of different PT modalities. Additionally, exploring the potential for personalized treatment plans based on individual patient profiles could further enhance therapeutic success. Supported by evidence, PT stands as a cornerstone in the management of PPS in women, offering a non-invasive, effective, and patient-centered approach to this complex syndrome.

References

1. Bordoni, Bruno, Kavin Sugumar and Stephen W. Leslie. "Anatomy, abdomen and pelvis, pelvic floor." (2018).

2. Federle, Michael P., Melissa L. Rosado-de-Christenson, Siva P. Raman and Brett W. Carter, et al. *Imaging Anatomy: Chest, Abdomen, Pelvis E-Book: Imaging Anatomy: Chest, Abdomen, Pelvis E-Book* Elsevier Health Sciences, 2016.

3. Faubion, Stephanie S., Lynne T. Shuster and Adil E. Bharucha. "Recognition and management of nonrelaxing pelvic floor dysfunction." In *Mayo Clinic Proceedings*, vol. 87pp. 187-193. B Elsevier, 2012.

4. Piloni, V., P. Tosi and M. Vernelli. "MR-defecography in obstructed defecation syndrome (ODS): technique, diagnostic criteria and grading." *Tech Coloproctol* 17 (2013): 501-510.

5. Lee, Tae Soon, Han Il Lee, Mi Kyoung Kim and Ki Hyuk Park, et al. "Treatment of Paradoxical Puborectalis Contraction (PPC) Using Botulinum Toxin-A." *J Korean soc coloproctology* 19 (2003): 90-93.

6. Colaiacomo, Maria Chiara, Gabriele Masselli, Elisabetta Polettini and Silvia Lanciotti, et al. "Dynamic MR imaging of the pelvic floor: a pictorial review." *Radiographics* 29(2009): e35.

7. Elshazly, Walid Galal and Heba Hassan. "Role of dynamic magnetic resonance imaging in management of obstructed defecation case series." *Int J Surg* 8 (2010): 274-282.

8. Payne, Isaac and Leander M. Grimm Jr. "Functional disorders of constipation: paradoxical puborectalis contraction and increased perineal descent." *Clin Colon Rectal Surg* 30 (2017): 022-029.

9. Mertz, Howard, Bruce Naliboff and Emeran Mayer. "Physiology of refractory chronic constipation." *Official journal of the American College of Gastroenterology| ACG* 94(1999): 609-615.

10. Rao, Satish Sanku Chander, R. S. Mudipalli, M. Stessman and B. Zimmerman. "Investigation of the utility of colorectal function tests and Rome II criteria in dyssynergic defecation (Anismus)." *Neurogastroenterol Motil* 16 (2004): 589-596.

11. Rao, Satish SC, Kimberly D. Welcher and Jennifer S. Leistikow. "Obstructive defecation: a failure

of rectoanal coordination." *Official journal of the American College of Gastroenterology ACG* 93 (1998): 1042-1050.

12. Rao, Satish SC, Ashok K. Tuteja, Tony Vellema and Joan Kempf, et al. "Dyssynergic defecation: demographics, symptoms, stool patterns and quality of life." *J Clin Gastroenterol* 38 (2004): 680-685.

13. Koch, Alexander, Winfried A. Voderholzer, Andreas G. Klauser and Stefan Müller-Lissner. "Symptoms in chronic constipation." *Diseases of the colon & rectum* 40 (1997): 902-906.

14. Sartori, Dulcegleika VB, Monica O. Gameiro, Hamilto A. Yamamoto and Paulo R. Kawano, et al. "Reliability of pelvic floor muscle strength assessment in healthy continent women." *BMC urology* 15 (2015): 1-6.

15. Felicíssimo, Mônica Faria, Márcia Mendonça Carneiro, Cristina Said Saleme and Rafael Zambelli Pinto, et al. "Intensive supervised versus unsupervised pelvic floor muscle training for the treatment of stress urinary incontinence: A randomized comparative trial." *Int Urogynecol J* 21 (2010): 835-840.

16. Constantinou, C.E., Omueti, D.M. and Luesley, D.M., 1991. The evaluation of perineometry in the assessment of pelvic floor muscle exercises. *Physiotherapy*. 77(10), pp.677-681.

17. Botelho, Simone, Larissa Carvalho Pereira, Joseane Marques and Ana Helena Lanza, et al. "Is there a correlation between electromyography and digital palpation as means of measuring pelvic floor muscle contractility in nulliparous, pregnant and postpartum women?" *Neurourol Urodyn* 32 (2013): 420-423.

18. Vasconcelos, Elaine Cristine Lemes Matheus. "Força e função muscular do assoalho pélvico: como avaliar?" *Fisioterapia Brasil* 14 (2013): 469-473.

19. Leonard, Charles T., Jason S. Brown, Timothy R. Price and Susan A. Queen, et al. "Comparison of surface electromyography and myotonometric measurements during voluntary isometric contractions." *J Electromyogr Kinesiol* 14 (2004): 709-714.

20. Drenth, Hans, Sytse U. Zuidema, Wim P. Krijnen and Ivan Bautmans, et al. "Psychometric properties of the MyotonPRO in dementia patients with paratonia." *Gerontology* 64 (2018): 401-412.

21. Alcaraz-Clariana, Sandra, Lourdes García-Luque, Juan Luis Garrido-Castro and César Fernández-de-Las-Peñas, et al. "Paravertebral muscle mechanical properties and spinal range of motion in patients with acute neck or low back pain: A case-control study." *Diagnostics* 11 (2021): 352.

22. Young, Fiorella Celsi, Iver Cristi-Sánchez, Claudia Danes-Daetz and Juan E. Monckeberg, et al. "Patellar tendon stiffness in elite breakdancers assessed by myotonometric measurement." *J Dance Med Sci* 22 (2018): 179-183.

23. Davidson, Melissa J., Adam L. Bryant, Wendy F. Bower and Helena C. Frawley. "Myotonometry reliably measures muscle stiffness in the thenar and perineal muscles." *Physiotherapy Canada* 69 (2017): 104-112.

24. Rodrigues-de-Souza, Daiana Priscila, Sandra Alcaraz-Clariana and Lourdes García-Luque, et al. "Absolute and relative reliability of the assessment of the muscle mechanical properties of pelvic floor muscles in women with and without urinary incontinence." *Diagnostics* 11(2021): 2315.

25. Schneider, Stefan, Aleko Peipsi, Maria Stokes and Axel Knicker, et al. "Feasibility of monitoring muscle health in microgravity environments using Myoton technology." *MED BIOL ENG COMPUT* 53 (2015): 57-66.

26. Dumoulin, Chantale, Marie-Claude Lemieux, Daniel Bourbonnais and Denis Gravel, et al. "Physiotherapy for persistent postnatal stress urinary incontinence: a randomized controlled trial." *Obstet Gynecol* 104 (2004): 504-510.

27. Frank, Dana L., Lamees Khorshid, Jerome F. Kiffer and Christine S. Moravec, et al. "Biofeedback in medicine: who, when, why and how?" *Mental health in family med* 7(2010): 85.

28. Kruger, Jennifer A., Poul MF Nielsen, Stephanie C. Budgett and Andrew J. Taberner. "An automated hand□held elastometer for quantifying the passive

stiffness of the levator ani muscle in women." *Neurourol Urodyn* 34 (2015): 133-138.

29. Dietz, Hans Peter. "Three-dimensional/Four-dimensional Pelvic Floor Ultrasound." *Donald School Textbook: Current Status of Clinical Use of 3D/4D Ultrasound in Obstetrics and Gynecology* (2019): 94.

30. Boyadzhyan, Lousine, Steven S. Raman and Shlomo Raz. "Role of static and dynamic MR imaging in surgical pelvic floor dysfunction." *Radiographics* 28 (2008): 949-967.

31. Crowell, Michael S., Erik A. Dedekam, Michael R. Johnson and Scott C. Dembowski, et al. "Diagnostic imaging in a direct-access sports physical therapy clinic: A 2-year retrospective practice analysis." *Int J Sports Phys Ther* 11 (2016): 708.

32. Reiner, C. S., Radu Tutuian, A. E. Solopova and D. Pohl, et al. "MR defecography in patients with dyssynergic defecation: spectrum of imaging findings and diagnostic value." *Br J Radiol* 84 (2011): 136-144.

33. García del Salto, Laura, Jaime de Miguel Criado, Luis Felipe Aguilera del Hoyo and Leticia Gutiérrez Velasco, et al. "MR imaging-based assessment of the female pelvic floor." *Radiographics* 34 (2014): 1417-1439.

34. Flusberg, Milana, V. Anik Sahni, Sukru M. Erturk and Koenraad J. Mortele. "Dynamic MR defecography: assessment of the usefulness of the defecation phase." *Am J Roentgenol* 196 (2011): W394-W399.

35. Lau, Chi-Wai, Steve Heymen, Omer Alabaz and Augustine JN Iroatulam, et al. "Prognostic significance of rectocele, intussusception and abnormal perineal descent in biofeedback treatment for constipated patients with paradoxical puborectalis contraction." *Diseases of the colon & rectum* 43 (2000): 478-482.

36. Emile, Sameh Hany, Hossam Ayman Elfeki, Hosam Ghazy Elbanna and Mohamed Youssef, et al. "Efficacy and safety of botulinum toxin in treatment of anismus: a systematic review." *World J Gastrointest Pharmacol Ther* 7 (2016): 453.

37. Rao, Satish SC. "Biofeedback therapy for constipation in adults." *Best Pract Res Clin Gastroenterol* 25 (2011): 159-166.

38. Simón, Miguel A., Ana M. Bueno, Patricia Otero and Fernando L. Vázquez, et al. "A randomized controlled trial on the effects of electromyographic biofeedback on quality of life and bowel symptoms in elderly women with dyssynergic defecation." *Int J Environ Res Public Health* 16 (2019): 3247.

39. Finazzi□Agrò, Enrico, Camilla Rocchi, Christa Pachatz and Filomena Petta, et al. "Percutaneous tibial nerve stimulation produces effects on brain activity: A study on the modifications of the long latency somatosensory evoked potentials." *Neurourology and Urodynamics: Official Journal of the International Continence Society* 28 (2009): 320-324.

40. Saba, Emmanuel Kamal Aziz and Mervat Sheta Elsawy. "Biofeedback pelvic floor muscle training versus posterior tibial nerve electrostimulation in the treatment of functional obstructed defecation: A prospective randomized clinical trial." *Egypt Rheumatol Rehabil* 49 (2022): 49.

41. Wang, Chih-Pin and Po-Yi Tsai. "Efficacy of spinal magnetic stimulation in elderly persons with chronic constipation." *J Chin Med Assoc* 75 (2012): 127-131.

42. Ahmed, Imtiaz, Muhammad Najmuddin Shabbir, Mohammad Ali Iqbal and Muhammad Shahzeb. "Role of defecation postures on the outcome of chronic anal fissure." *Pak J Surg* 29 (2013): 269-271.

43. Modi, Rohan M., Alice Hinton, Daniel Pinkhas and Royce Groce, et al. "Implementation of a defecation posture modification device: impact on bowel movement patterns in healthy subjects." *J Clin Gastroenterol* 53 (2019): 216-219.

Citation: Ali, Mohamed G. and Rehab S. Mamoon. "Physical Therapy for Hypertonic Pelvic Floor in Women: Paradoxical Puborectalis Syndrome: A Narrative Review Article." *J Gynecol Matern Health* (2024): 111. DOI: 10.59462/ JGMH.2.2.111