

The pathophysiology of OPF

By Linda McLean

References

- Abbott J. Gynecological indications for the use of botulinum toxin in women with chronic pelvic pain. *Toxicon* 2009;54:647–53. doi:10.1016/j.toxicon.2009.01.036.
- Bertolasi L, Frasson E, Cappelletti JY, Vicentini S, Bordignon M, Graziottin A. Botulinum Neurotoxin Type A Injections for Vaginismus Secondary to Vulvar Vestibulitis Syndrome. *Obstet Gynecol* 2009;114:1008–16. doi:10.1097/AOG.0b013e3181bb0dbb.
- Butrick CW. Pathophysiology of pelvic floor hypertonic disorders. *Obstet Gynecol Clin North Am.* 2009;36(3):699–705.
- Butrick CW. Pelvic floor hypertonic disorders: identification and management. *Obstet Gynecol Clin North Am.* 2009;36(3):707–22.
- Davidoff RA. Skeletal muscle tone and the misunderstood stretch reflex. *Neurology* 1992;45:951–63.
- Engman M, Lindehammar H, Wijma B. Surface electromyography diagnostics in women with partial vaginismus with or without vulvar vestibulitis and in asymptomatic women. *J Psychosom Obstet Gynecol* 2004;25:281–94. doi:10.1080/01674820400017921.
- Faubion SS, Shuster LT, Bharucha AE. Recognition and management of nonrelaxing pelvic floor dysfunction. *Mayo Clin Proc.* 2012;87(2):187–93.
- FitzGerald MP, Kotarinos R. Rehabilitation of the short pelvic floor. I: background and patient evaluation. *Int Urogynecol J Pelvic Floor Dysfunct.* 2003;14(4):261–8.
- FitzGerald MP, Kotarinos R. Rehabilitation of the short pelvic floor. II: treatment of the patient with the short pelvic floor. *Int Urogynecol J Pelvic Floor Dysfunct.* 2003;14(4):269–75.
- Frasson E, Graziottin A, Priori A, Dall’Ora E, Didonè G, Garbin EL, et al. Central nervous system abnormalities in vaginismus. *Clin Neurophysiol* 2009;120:117–22. doi:10.1016/j.clinph.2008.10.156.
- Gammoudi N, Affes Z, Mellouli S, Radhouane K, Dogui M. The diagnosis value of needle electrode electromyography in vaginismus. *Sexologies* 2016;25:e57–60. doi:10.1016/j.sexol.2016.04.005.
- Gentilcore-Saulnier E, McLean L, Goldfinger C, Pukall CF, Chamberlain S. Pelvic Floor Muscle Assessment Outcomes in Women With and Without Provoked Vestibulodynia and the Impact of a Physical Therapy Program. *J Sex Med* 2010;7:1003–22. doi:10.1111/j.1743-6109.2009.01642.x.
- Gillies AR, Bushong EA, Deerinck TJ, Ellisman MH, Lieber RL. Three-Dimensional Reconstruction of Skeletal Muscle Extracellular Matrix Ultrastructure. *Microsc Microanal* 2014;20:1835–40. doi:10.1017/S1431927614013300.
- Glazer HI, Jantos M, Hartmann EH, Swencionis C. Electromyographic comparisons of the pelvic floor in women with dysesthetic vulvodynia and asymptomatic women. *J Reprod Med* 1998;43:959–62.

Goldfinger C, Pukall CF, Thibault-Gagnon S, McLean L, Chamberlain S. Effectiveness of Cognitive-Behavioral Therapy and Physical Therapy for Provoked Vestibulodynia: A Randomized Pilot Study. *J Sex Med* 2016;13:88–94. doi:10.1016/j.jsxm.2015.12.003.

Gordon J, Ghez C. Chapter 37: Muscle Receptors and Spinal Reflexes: The Stretch Reflex. In: Kandel ER, Schwartz JK, Jessell TM, editors. *Princ. Neural Sci.* 3rd ed., Norwalk CT, USA: Appleton and Laing; 1991.

Hill DK. Tension due to interaction between the sliding filaments in resting striated muscle. the effect of stimulation. *J Physiol* 1968;199:637–84. doi:10.1113/jphysiol.1968.sp008672.

Holstege, H. How the emotional motor system controls the pelvic organs. *Sex Med Rev* 2016;4:303 e3282016.

Huynh HK, Willemsen ATM, Lovick TA, Holstege G. Pontine Control of Ejaculation and Female Orgasm. *J Sex Med* 2013;10:3038–48. doi:10.1111/jsm.12300.

Luijckx R, Hermens H, Bodar L, Vossen CJ, Os J Van, Lousberg R. Experimentally Induced Stress Validated by EMG Activity. *PLoS One* 2014;9:e95215. doi:10.1371/journal.pone.0095215.

Lukban J, Whitmore K, Kellogg-Spadt S, Bologna R, Leshner A, Fletcher E. The effect of manual physical therapy in patients diagnosed with interstitial cystitis, high-tone pelvic floor dysfunction, and sacroiliac dysfunction. *Urology*. 2001;57(6 Suppl 1):121–2. Epub 2001/05/30.

McLean, L and Brooks K., What does electromyography tell us about dyspareunia? *Sexual Medicine Reviews*. In press. July 2017.

Mense S, Simons DG, Russell J. *Muscle Pain: Understanding Its Nature, Diagnosis, and Treatment*. 1st ed. Philadelphia: Lippincott Williams & Wilkins; 2001.

Messelink B, Benson T, Berghmans B, Bo K, Corcos J, Fowler C, 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(4):374–80.

Meyer GA, Lieber RL. Elucidation of extracellular matrix mechanics from muscle fibers and fiber bundles. *J Biomech* 2011;44:771–3. doi:10.1016/j.jbiomech.2010.10.044.

Moldwin RM, Fariello JY. Myofascial Trigger Points of the Pelvic Floor: Associations with Urological Pain Syndromes and Treatment Strategies Including Injection Therapy. *Curr Urol Rep* 2013;14:409–17. doi:10.1007/s11934-013-0360-7.

Morin, M., Binik, Y, Bourbonnais, D, et al.. Heightened pelvic floor muscle tone and altered contractility in women with provoked vestibulodynia. *Journal of Sexual Medicine*. 2017. 14(4) 592-600. <https://doi.org/10.1016/j.jsxm.2017.02.012>.

Morrissey D, El-Khawand D, Ginzburg N, Wehbe S, O'Hare P, Whitmore K. Botulinum Toxin A Injections Into Pelvic Floor Muscles Under Electromyographic Guidance for Women With Refractory High-Tone Pelvic Floor Dysfunction. *Female Pelvic Med Reconstr Surg* 2015;21:277–82. doi:10.1097/SPV.000000000000177.

Oyama IA, Rejba A, Lukban JC, Fletcher E, Kellogg-Spadt S, Holzberg AS, et al. Modified Thiele massage as therapeutic intervention for female patients with interstitial cystitis and high-tone pelvic floor dysfunction. *Urology*. 2004;64(5):862–5.

- Pelletier F, Parratte B, Penz S, Moreno J-P, Aubin F, Humbert P. Efficacy of high doses of Botulinum toxin A for treating provoked vestibulodynia. *Br J Dermatol* 2011;164:no – no. doi:10.1111/j.1365-2133.2011.10235.x.
- Pezzone, MA, Liang, R., Fraser, MO. A model of neural cross-talk and irritation in the pelvis: implications for the overlap of chronic pelvic pain disorders. *Gastroenterology*. 2005. 128(7) 1953-1964.
<https://doi.org/10.1053/j.gastro.2005.03.008>
- Pukall, C., Strigo, I, Binik, Y. et al., Neural correlates of painful genital touch in women with vulvar vestibulitis syndrome, *Pain*. 2005. 115(1-2) 118-127. DOI: 10.1016/j.pain.2005.02.020.
- Reissing ED, Brown C, Lord MJ, Binik YM, Khalifé S. Pelvic floor muscle functioning in women with vulvar vestibulitis syndrome. *J Psychosom Obstet Gynecol* 2005;26:107–13. doi:10.1080/01443610400023106.
- Rogalski MJ, Kellogg-Spadt S, Hoffmann AR, Fariello JY, Whitmore KE. Retrospective chart review of vaginal diazepam suppository use in high tone pelvic floor dysfunction. *Int Urogynecol J*. 2010;21(7):895–9.
- Segura JW, Opitz JL, Greene LF. Prostatitis, prostatitis or pelvic floor tension myalgia. *J Urol*. 1979;122(2):168–9.
- Seidel, EM, Pfabigan, DM, Hahn, A., et al. Uncertainty during pain anticipation: the adaptive value of preparatory processes. *Human Brain Mapping*.2014.36(2).
- Shafik A, El Sibai O. Study of the pelvic floor muscles in vaginismus: a concept of pathogenesis. *Eur J Obstet Gynecol Reprod Biol* 2002;105:67–70. doi:10.1016/S0301-2115(02)00115-X.
- Shafik A, Shafik IA, El Sibai O, Shafik AA. A study of the effect of straining on the cavernosus muscles: identification of “straining-cavernosus reflex” and its clinical significance. *Andrologia* 2008;40:23–8. doi:10.1111/j.1439-0272.2008.00804.x.
- Shafik A, Shafik IA, Shafik AA, El Sibai O. Effect of Urethral Stimulation on Vesical Contractile Activity. *Am J Med Sci* 2007;334:240–3. doi:10.1097/MAJ.0b013e3180a6ef3f.
- Shafik A, Shafik AA, El Sibai O, Shafik IA. The Response of the Corporal Tissue and Cavernosus Muscles to Urethral Stimulation: An Effect of Penile Buffeting of the Vaginal Introitus. *J Androl* 2007;28:853–7. doi:10.2164/jandrol.107.002618.
- Shafik A, Shafik I, Shafik AA, El Sibai O. The cavernoso-anal reflex: response of the anal sphincters to cavernosus muscles’ stimulation. *Asian J Androl* 2006;8:331–6. doi:10.1111/j.1745-7262.2006.00126.x.
- Shafik A, Shafik I, El Sibai O, Shafik AA. Role of the Perineal Muscles in Micturition. *J Pelvic Med Surg* 2006;12:19–24. doi:10.1097/01.spv.0000199533.60662.36.
- Shah, JP, Thaker, M, Heimur, J et al. Myofascial Trigger Points Then and Now: A Historical and Scientific Perspective *Physical Medicine and Rehabilitation*. 2015. 7(7) 746-761. doi: [10.1016/j.pmrj.2015.01.024](https://doi.org/10.1016/j.pmrj.2015.01.024).
- Sherrington CS. Decerebrate Rigidity, and Reflex Coordination of Movements. *J Physiol* 1898;22:319–32. doi:10.1113/jphysiol.1898.sp000697.

Simons, S.G., Mense, S. Understanding and measurement of muscle tone as related to clinical muscle pain. *Pain*, 1998. 1–17.

Sinaki M, Merritt JL, Stillwell GK. Tension myalgia of the pelvic floor. *Mayo Clin Proc*. 1977;52(11):717–22.

Thibault-Gagnon, S., Definitions and Basic Etiology of the Overactive Pelvic Floor. In Padua and Rosenbaum, *The Overactive Pelvic Floor*, Springer-Verlag. 2016. ISBN 978-3-319-22149-6 ISBN 978-3-319-22150-2 (eBook) DOI 10.1007/978-3-319-22150-2

Travell JG, Simons DG. *Myofascial pain and dysfunction : the trigger point manual*. Williams & Wilkins; Baltimore: 1983.

Vandyken, C., Hilton, S. Physical therapy in the Treatment of Central Pain Mechanisms for Female Sexual Pain. *Sexual Medicine Reviews*. 2017. 5(1) 20-30.

Van Lunsen RHW, Ramakers MJ. The hyperactive pelvic floor syndrome (HPFS): psychosomatic and psycho-sexual aspects of hyperactive pelvic floor disorders with co-morbidity of uro-gynaecological, gastro- intestinal and sexual symptomatology. *Acta Endosc*. 2002;32(3):275–85.

Weiss, J., Pelvic floor myofascial trigger points: manual therapy for interstitial cystitis and the urgency-frequency syndrome. *Clinical Urology*. 2001. 166(6) 2226-2231. [https://doi.org/10.1016/S0022-5347\(05\)65539-5](https://doi.org/10.1016/S0022-5347(05)65539-5).

White G, Jantos M, Glazer H. Establishing the diagnosis of vulvar vestibulitis. *J Reprod Med* 1997;42:157–60.01
Yang, CC, Lee, JC, Kromm, BG, Ciol, MA, Berger, RE. Pain sensitization in male chronic pelvic pain syndrome: why are symptoms so difficult to treat? *Clinical Urology*. 2003. 170(3) 823-827.
<https://doi.org/10.1097/01.ju.0000082710.47402.03>.

Zoorob D, South M, Karram M, Sroga J, Maxwell R, Shah A, et al. A pilot randomized trial of levator injections versus physical therapy for treatment of pelvic floor myalgia and sexual pain. *Int Urogynecol J* 2015;26:845–52. doi:10.1007/s00192-014-2606-4.