

FPC Training - Selected Scientific References

Background literature for the broader physiological, rehabilitation, biomechanical and motor-learning foundations discussed in the course

Scope note. These papers support parts of the broader background around pelvic-floor training, male pelvic rehabilitation, pelvic-floor relaxation and muscle tone, posture/body position, pelvic tilt mechanics, hip-pelvis-lumbar relationships, support and stabilization, and motor learning. They do not directly validate the FPC protocol itself, including the 7 s OFF -> 13 s ON timing, the three support-base framework, the nine-drill system, or FPC-specific clinical outcomes. Several posture/movement studies use female cohorts or non-FPC tasks; they are included as physiological or biomechanical context, not as direct evidence for male FPC efficacy or for any specific FPC drill.

General health, cardiovascular context and erectile function

Supports the broader health and cardiovascular context around erectile function discussed in the course; it does not validate FPC.

1. Khera M, et al. Effect of aerobic exercise on erectile function: systematic review and meta-analysis of randomized controlled trials. *J Sex Med.* 2023;20(12):1369-1375. doi:10.1093/jsxmed/qdad130. PMID: 37814532.
2. Zhao B, Hong Z, Wei Y, et al. Erectile Dysfunction Predicts Cardiovascular Events as an Independent Risk Factor: A Systematic Review and Meta-Analysis. *J Sex Med.* 2019;16:1005-1017. doi:10.1016/j.jsxm.2019.04.004. PMID: 31104857.

Male pelvic-floor training and sexual function

Supports the broader evidence that pelvic-floor training has been studied in male sexual function. These studies did not test the FPC protocol or the FPC-specific requirement to maintain continuous pelvic movement while activation and release remain independent.

3. Dorey G, Speakman M, Feneley R, Swinkels A, Dunn C, Ewings P. Randomised controlled trial of pelvic floor muscle exercises and manometric biofeedback for erectile dysfunction. *Br J Gen Pract.* 2004;54(508):819-825. PMID: 15527607.
4. Myers C, Smith M. Pelvic floor muscle training improves erectile dysfunction and premature ejaculation: a systematic review. *Physiotherapy.* 2019;105(2):235-243. doi:10.1016/j.physio.2019.01.002. PMID: 30979506.
5. Wong C, Louie DR, Beach C. A Systematic Review of Pelvic Floor Muscle Training for Erectile Dysfunction After Prostatectomy and Recommendations to Guide Further Research. *J Sex Med.* 2020;17(4):737-748. doi:10.1016/j.jsxm.2020.01.008. PMID: 32029399.

Male pelvic-floor rehabilitation after prostatectomy

Provides rehabilitation context for basic pelvic-floor training, confirmed contraction and the course's medical-starting-point guidance. These protocols are not FPC.

6. Kannan P, Winsor SJ, Fung B, Cheing G. Effectiveness of Pelvic Floor Muscle Training Alone and in Combination With Biofeedback, Electrical Stimulation, or Both Compared to Control for Urinary Incontinence in Men Following Prostatectomy: Systematic Review and Meta-Analysis. *Phys Ther.* 2018;98(11):932-945. doi:10.1093/ptj/pty101. PMID: 30137629.
7. Yang JM, Ye H, Long Y, et al. Effect of pelvic floor muscle training on urinary incontinence after radical prostatectomy: An umbrella review of meta-analysis and systematic review. *Clin Rehabil.* 2023;37(4):494-515. doi:10.1177/02692155221136046. PMID: 36305082.
8. Atabey Gerlegiz EN, Ozturk D, Gursen C, Akbayrak T, Ozgul S. Structured and supervised pelvic floor muscle training following confirmed contraction in post-prostatectomy urinary incontinence: a systematic review of randomized controlled trials. *J Cancer Surviv.* 2025. doi:10.1007/s11764-025-01882-6. PMID: 40877548.
9. Leao Ribeiro I, Lorca LA, Peviani Messa S, et al. Effectiveness of early pelvic muscle training on pelvic floor strength, urinary incontinence symptoms, sexual function, and quality of life in post-radical prostatectomy patients: systematic review of randomized clinical trials. *Rehabilitacion (Madr).* 2024;58(2):100828. doi:10.1016/j.rh.2023.100828. PMID: 38141425.

Pelvic-floor relaxation and muscle tone

Provides context for the course distinction between activation and the ability to release or reduce unnecessary pelvic-floor activity. This is not evidence that the FPC 7/13 timing is optimal.

10. Yaacov D, Nelinger G, Kalichman L. The Effect of Pelvic Floor Rehabilitation on Males with Sexual Dysfunction: A Narrative Review. *Sex Med Rev.* 2022;10(1):162-167. doi:10.1016/j.sxmr.2021.02.001. PMID: 33931383.

Pelvic-floor activity, posture and body position

Supports the physiological context that pelvic-floor and related lumbopelvic muscle activity, resting position and contraction behavior can change with posture, pelvic orientation and body position. Several studies use female cohorts; Cowley et al. provides direct male body-position data.

11. Capson AC, Nashed J, McLean L. The role of lumbopelvic posture in pelvic floor muscle activation in continent women. *J Electromyogr Kinesiol.* 2011;21(1):166-177. doi:10.1016/j.jelekin.2010.07.017. PMID: 20833070.
12. Ptazkowski K, Zdrojowy R, Slupska L, et al. Assessment of bioelectrical activity of pelvic floor muscles depending on the orientation of the pelvis in menopausal women with symptoms of stress urinary incontinence: continued observational study. *Eur J Phys Rehabil Med.* 2017;53(4):564-574. doi:10.23736/S1973-9087.17.04475-6. PMID: 28145398.
13. Madill SJ, McLean L. Quantification of abdominal and pelvic floor muscle synergies in response to voluntary pelvic floor muscle contractions. *J Electromyogr Kinesiol.* 2008;18(6):955-964. doi:10.1016/j.jelekin.2007.05.001. PMID: 17646112.
14. Lee K. Investigation of Electromyographic Activity of Pelvic Floor Muscles in Different Body Positions to Prevent Urinary Incontinence. *Med Sci Monit.* 2019;25:9357-9363. doi:10.12659/MSM.920819. PMID: 31813929.
15. Cowley D, Stafford RE, Hodges PW. Influence of body position on dynamics of the pelvic floor measured with transperineal ultrasound imaging in men. *Neurourol Urodyn.* 2020;39(3):954-961. doi:10.1002/nau.24301. PMID: 32027772.

Pelvic tilt, hip-pelvis and lumbopelvic mechanics

Provides biomechanical context for the course cues that pelvic tilt changes pelvic orientation within an interacting hip-pelvis-lumbar system; spinal shape may respond to pelvic rotation, knee/hamstring conditions can alter pelvic motion, and trunk stabilization strategies can change lumbopelvic motion. These studies did not test the FPC nine-drill sequence.

16. Takaki S, Kaneoka K, Okubo Y, et al. Analysis of muscle activity during active pelvic tilting in sagittal plane. *Phys Ther Res*. 2016;19(1):50-57. doi:10.1298/ptr.e9900. PMID: 28289581.
17. Levine D, Whittle MW. The effects of pelvic movement on lumbar lordosis in the standing position. *J Orthop Sports Phys Ther*. 1996;24(3):130-135. doi:10.2519/jospt.1996.24.3.130. PMID: 8866271.
18. Congdon R, Bohannon R, Tiberio D. Intrinsic and imposed hamstring length influence posterior pelvic rotation during hip flexion. *Clin Biomech (Bristol)*. 2005;20(9):947-951. doi:10.1016/j.clinbiomech.2005.03.011. PMID: 15975697.
19. Tateuchi H, Taniguchi M, Mori N, Ichihashi N. Balance of hip and trunk muscle activity is associated with increased anterior pelvic tilt during prone hip extension. *J Electromyogr Kinesiol*. 2012;22(3):391-397. doi:10.1016/j.jelekin.2012.03.003. PMID: 22464201.
20. Suehiro T, Mizutani M, Watanabe S, Ishida H, Kobara K, Osaka H. Comparison of spine motion and trunk muscle activity between abdominal hollowing and abdominal bracing maneuvers during prone hip extension. *J Bodyw Mov Ther*. 2014;18(3):482-488. doi:10.1016/j.jbmt.2014.04.012. PMID: 25042326.
21. Mills ES, Richardson MK, Wang JC, Chung BC, Romoff M, Heckmann ND. Defining the relationship between the hip, pelvis, and lumbar spine. *N Am Spine Soc J*. 2026;26:100883. doi:10.1016/j.xnsj.2026.100883. PMID: 42212188.

Support, asymmetry and front-supported stabilization

Provides context for why support geometry and stabilization strategy can change pelvic motion, and why longer-lever front-supported positions can increase abdominal stabilization demand. These studies used non-FPC exercises and do not establish the optimal mechanics, order or difficulty of FPC Drills 3 or 7-9.

22. Kim DW, Kim TH. Effects of abdominal hollowing and abdominal bracing during side-lying hip abduction on the lateral rotation and muscle activity of the pelvis. *J Exerc Rehabil*. 2018;14(2):226-230. doi:10.12965/jer.1836102.051. PMID: 29740556.
23. Schoenfeld BJ, Contreras B, Tiryaki-Sonmez G, Willardson JM, Fontana F. An electromyographic comparison of a modified version of the plank with a long lever and posterior tilt versus the traditional plank exercise. *Sports Biomech*. 2014;13(3):296-306. doi:10.1080/14763141.2014.942355. PMID: 25325773.

Six-week training and neuromuscular reassessment

Provides indirect context for using six weeks as a practical reassessment window. This uncontrolled pilot included 16 healthy young men, used non-FPC exercises, and measured neuromuscular activity rather than sexual or functional outcomes. It does not validate FPC or its six-week training block.

29. Labun J, Piernicka M, Sienkowska B, Szumilewicz A. Effects of a 6-week pelvic floor muscle training on neuromuscular activity in healthy young men: a pilot study. *Front Public Health*. 2026;14:1781361. doi:10.3389/fpubh.2026.1781361. PMID: 42040136.

Motor learning, task specificity and transfer

Supports the general course statements about practice conditions, task specificity, variation and transfer. None of these papers studied pelvic-floor training or demonstrated that the specific FPC sequence is superior to another sequence.

24. Hubbard IJ, Parsons MW, Neilson C, Carey LM. Task-specific training: evidence for and translation to clinical practice. *Occup Ther Int*. 2009;16(3-4):175-189. doi:10.1002/oti.275. PMID: 19504501.
25. Kitago T, Krakauer JW. Motor learning principles for neurorehabilitation. *Handb Clin Neurol*. 2013;110:93-103. doi:10.1016/B978-0-444-52901-5.00008-3. PMID: 23312633.
26. Levin MF, Demers M. Motor learning in neurological rehabilitation. *Disabil Rehabil*. 2021;43(24):3445-3453. doi:10.1080/09638288.2020.1752317. PMID: 32320305.
27. Grierson LEM. Information processing, specificity of practice, and the transfer of learning: considerations for reconsidering fidelity. *Adv Health Sci Educ Theory Pract*. 2014;19(2):281-289. doi:10.1007/s10459-014-9504-x. PMID: 24691891.
28. Czyz SH, Wojcik AM, Solarska P. The effect of contextual interference on transfer in motor learning - a systematic review and meta-analysis. *Front Psychol*. 2024;15:1377122. doi:10.3389/fpsyg.2024.1377122. PMID: 39205981.

Prepared for the FPC Training course reference section. Selected references checked against PubMed and/or publisher records. This is a selected reference list rather than a systematic review.