

Pelvic Floor Dysfunction in the Athletic Population





French gymnast springs a leak!

Olympic star has a tiddly problem mid-routine

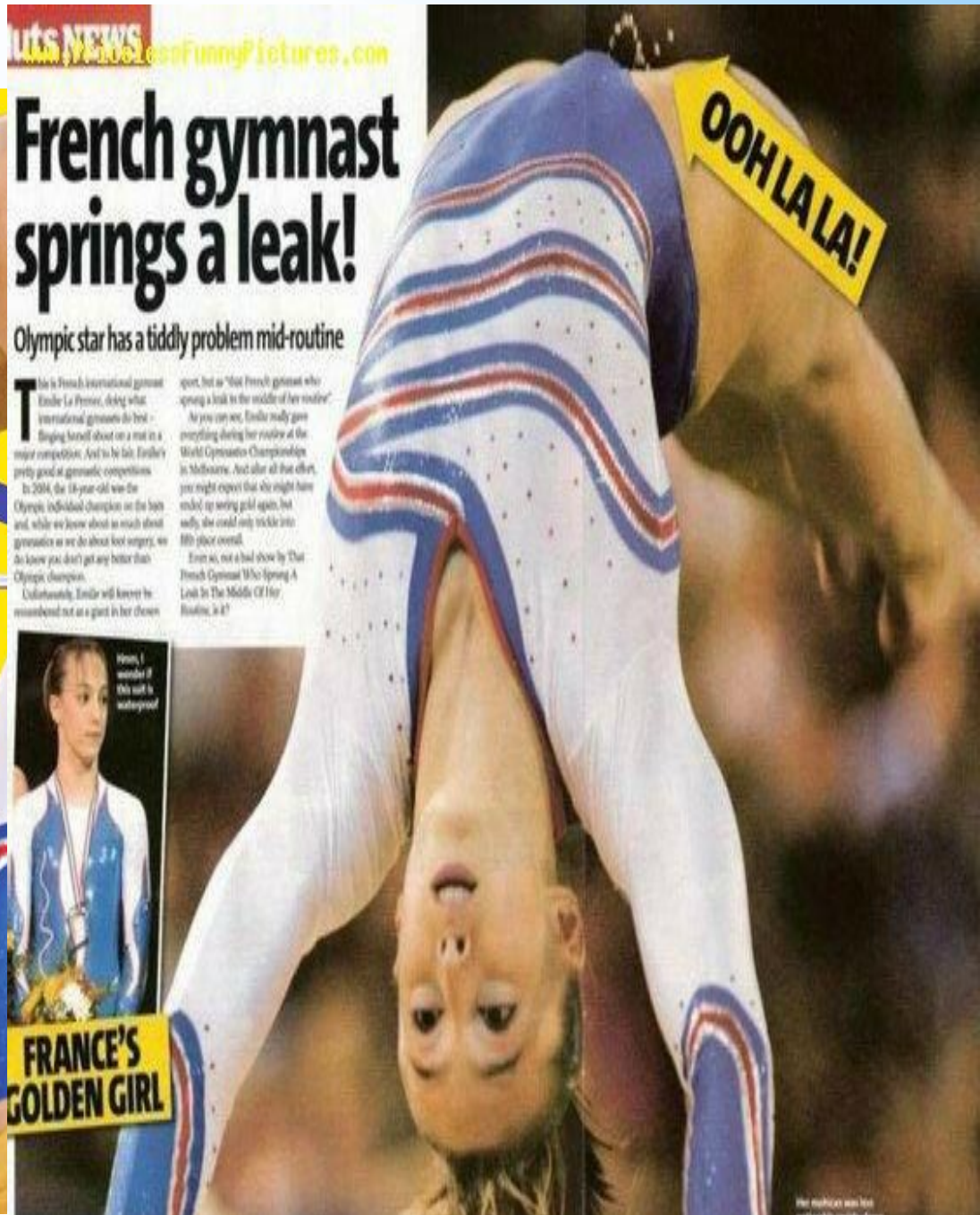
This is French international gymnast Evie Le Pennec, doing what international gymnasts do best - being herself about as much as a major competition. And to be fair, Evie's pretty good at gymnastic competitions. In 2004, the 18-year-old was the Olympic individual champion on the bars and, while we know about as much about gymnastics as we do about foot surgery, we do know you don't get any better than Olympic champion. Unfortunately, Evie will forever be remembered not as a girl in her chosen

sport, but as "that French gymnast who sprung a leak in the middle of her routine". As you can see, Evie really gave everything during her routine at the World Gymnastics Championships in Melbourne. And after all that effort, you might expect that she might have ended up seeing gold again, but sadly, she could only tinkle into 10th place overall. Even so, not a bad show by That French Gymnast Who Sprung A Leak In The Middle Of Her Routine, is it?



When I wonder if this suit is waterproof

FRANCE'S GOLDEN GIRL



The musician was hot and could easily dance

Crossfit: Do you pee during workouts?

<https://youtu.be/UKzq1upN>

lgU

- *Describe the **anatomy** and function of the Pelvic Floor (PF) and its related musculature.
- *Implement the golden question with every patient/athlete to **screen** for pelvic floor dysfunction (PFD).
- *Discuss the **types, prevalence, and risk** factors of various types of PFD within athletes and non athletes.
- *Understand Dx **clusters orthopedic** considerations for PFD.
- *Develop a **POC** for PFD incorporating educational, behavioral, exercise strategies as appropriate.
- *Understand when to **refer out** to a pelvic floor physical therapist.

*Objectives

- * **Stress Urinary Incontinence (SUI)**: urinary leakage during exercise, coughing, sneezing, laughing, or any body movement that puts pressure on the bladder.
- * **Urge Urinary Incontinence (UUI)**: Strong sensation to void and leaking
- * **Mixed UI**: combination of stress and urge incontinence
- * UI for both female and male elite athletes found 33% of athletes 45.1% female and 14.7% males. (Rodriguez)

* **Scope of Incontinence**

*Sphincteric

*Sexual

*Supportive



*Pelvic Floor Function



DETERMINATION

Not even diarrhea stands in his way

* Incontinence and Exercise

* N=156 competitive varsity athletics US university. Mean age = 19.9. 28% at least 1 episode while practicing or competing; gymnastics 67%, tennis 50%, BB 44%, field hockey 32%, track 26%, VB 9%

Nygaard I, Thompson FL, Svengalis SL, et al. Urinary incontinence in elite nulliparous athletes. *Obstet Gynecol*. 1994; 84:183-7.

* 8 Danish sport clubs competing at Natl. level N = 397 (mean age = 22.8 yrs). 51.9% urine loss during sport or daily life. 43% during sport: gymnastics 56%, ballet 43%, aerobics 40%

Thyssen HH, Clevin L, Olesen S, et al. Urinary incontinence in elite female athletes and dancers. *Int Urogynecol J Pelvic Floor Dysfunct* 2002; 13:15-17.

* Prevalence of UI in collegiate female Athletes

N = 177 (109 athletes; 68 non-athletes Female college students= 18-25	SUI: laughing coughing sneezing	SUI: physical effort	Urge
Athletes	46.8	40.7	26.9
Non-athletes	48.5	29.4	30.9

No significant relationship between groups.

* Prevalence of Urinary Incontinence in HS Females: Implications for Prevention and Wellness Education

Dockter, M., Becker, E, Huber, C, Lacher, J, Obeng, L. JWHPT Jan 2008.

Age	Leakage with Coughing, Sneezing, or Laughing	Leakage with Physical Effort or Exertion	Leakage with Urge	No Leakage	Leakage Percent
15.00 (n=14)	5	2	2	8	42.9%
16.00 (n=43)	14	11	6	26	39.5%
17.00 (n=30)	12	7	6	18	40%
18.00 (n=3)	3	1	1	0	100%
TOTAL (N=90)	34	21	15	52	

*Results: Comparing Sports

	SUI: Laughing Coughing sneezing	SUI: Physical Effort	Urge
Basketball	18.2	18.2	9.1
Softball	33.3	41.7	25.0
Volleyball	63.6	42.9	42.9
Cheerleading	22.2	22.2	11.1
Soccer	65.0	22.7	20.0
Track & Field	58.3	40.7	54.2

- * Running: 3-4x
- * Jumping: 5-12 x*
- * Landing from somersault: 9x
- * Landing from double back somersault: 14x
- * Long jump: 16 x
- * Lead foot on javelin throw: 9x

Sports



*Prevention

- * 39.5% had reported that they use some type of prevention for UI
 - * Increase frequency of urination 16.4%
 - * Nothing 12.4%
 - * Holding their urine/avoiding laughing 7.3%
 - * Refrain from drinking water.

*78.5% of subjects had not received education

*Methods of education

*Media 9.6%

*Healthcare professional 2.3%

*Coach 0.6%

*School 2.3%

*Other 1.7%



***Education**

1. Pelvic floor
2. Diaphragm
3. Abdominals
4. Multifidi



* Core

1. LBP:
 - a. Piriformis syndrome and LBP
 - b. SI joint dysfunction and coccyx pain
2. Hip:
 - a. Hip Fractures and replacements
 - b. Labral tears and impingement
 - c. Adductor injuries and hamstring strains
3. Abdominal wall:
 - a. Peripheral nerve entrapments
 - b. Core instability/failed load transfer
 - c. Diastasis recti abdominis (DRA)

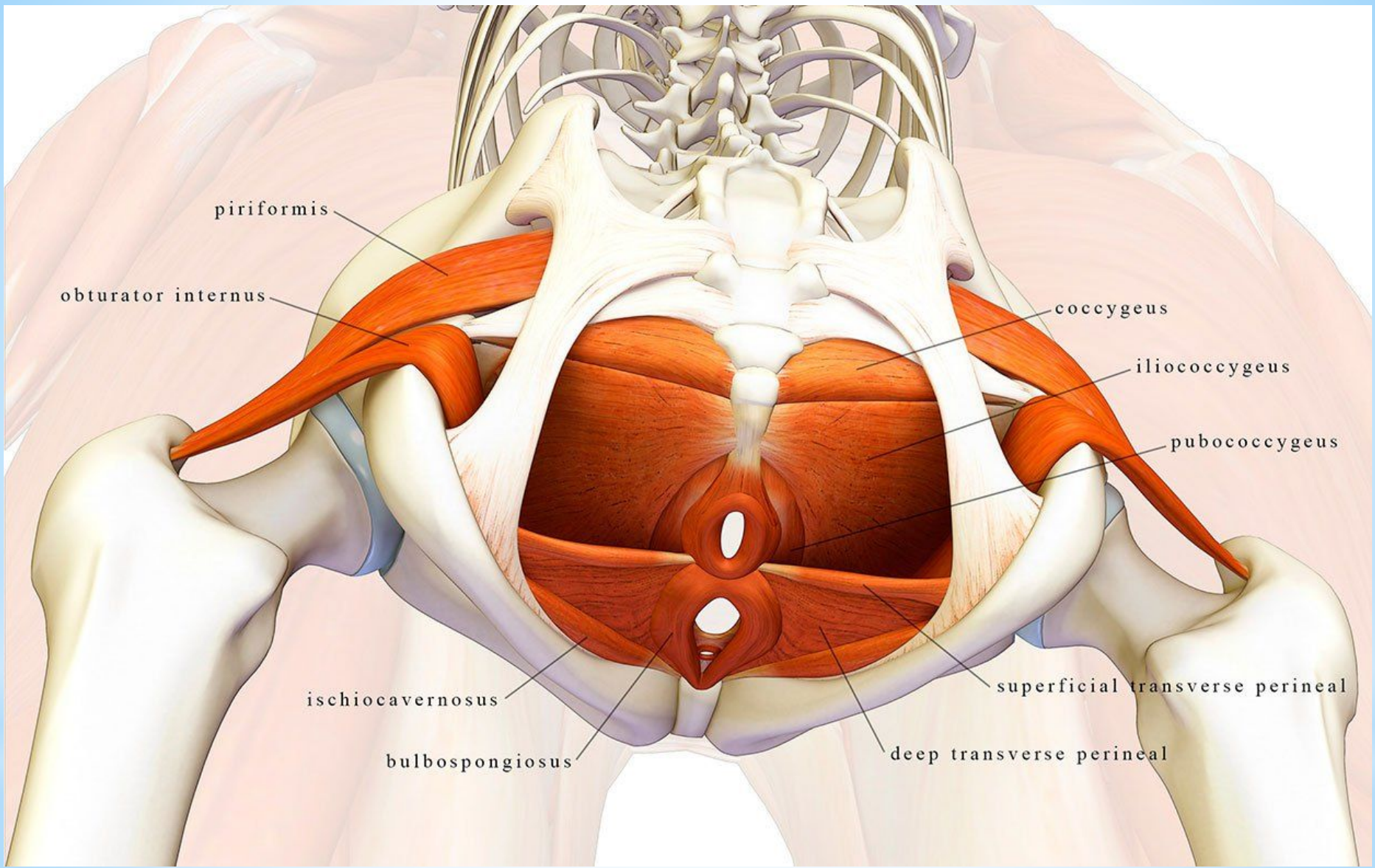
*** Conditions assoc with PFD**

- * Low back pain (LBP): 12th rib to gluteal fold
- * Pelvic girdle pain (PGP) - Iliac crest to gluteal fold, particularly in sacroiliac joints
 - * Pain radiation in the posterior thigh
 - * With or without pubic symphysis pain

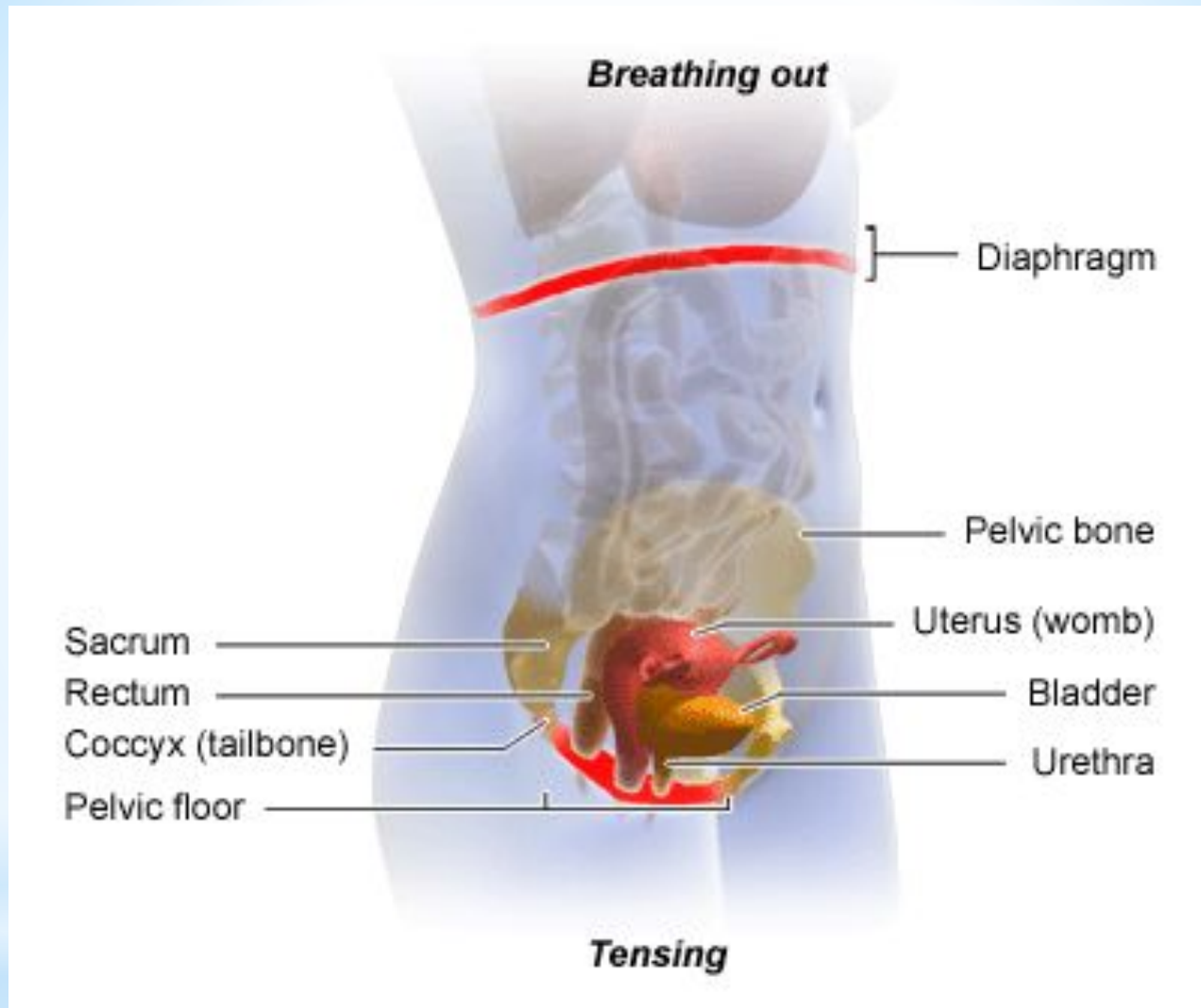
* Lumbopelvic Pain

- * Douglass reports that in a study of 54 women with LBP, 31 with UI and 23 without.
 - * Regardless both groups had pelvic floor mm weakness.
- * Dufour found
 - * Women with low back pain (N: 85) were screened for pelvic floor muscle dysfunction
 - * 95% were determined to have a least one pelvic floor muscle dysfunction
 - * 71%: pelvic floor muscle tenderness
 - * 66%: pelvic floor weakness
 - * 41%: pelvic organ prolapse

*** LBP and UI**



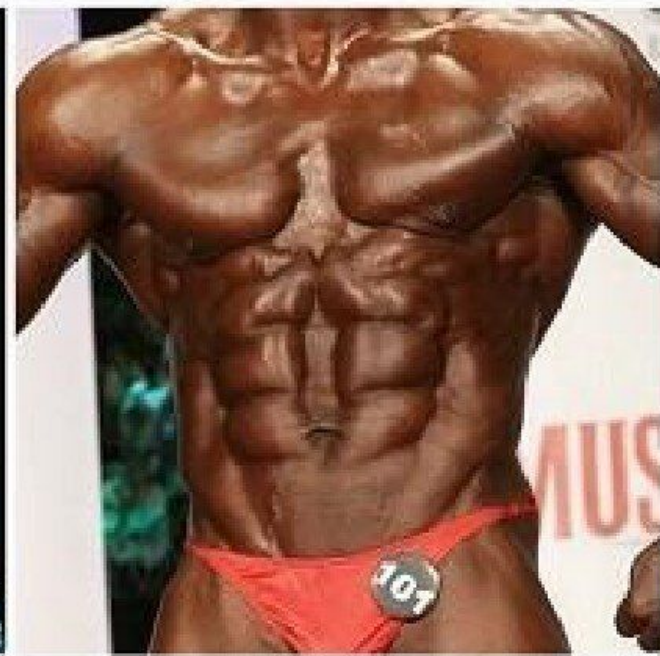
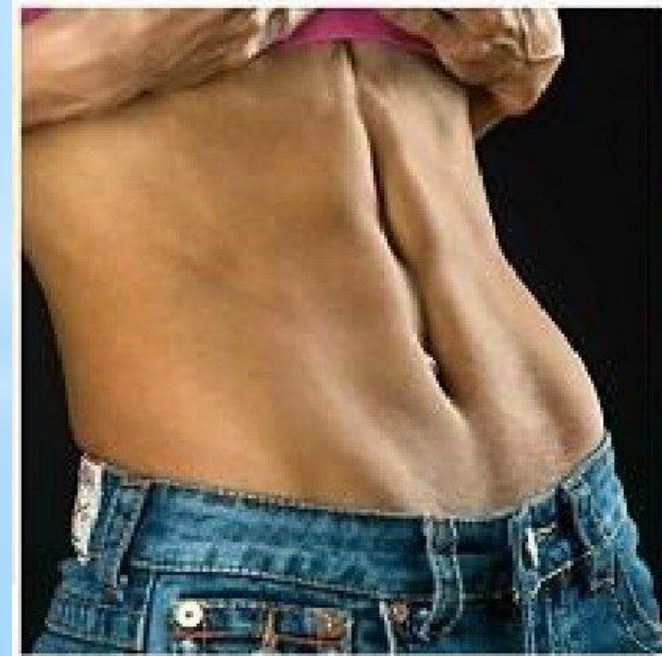
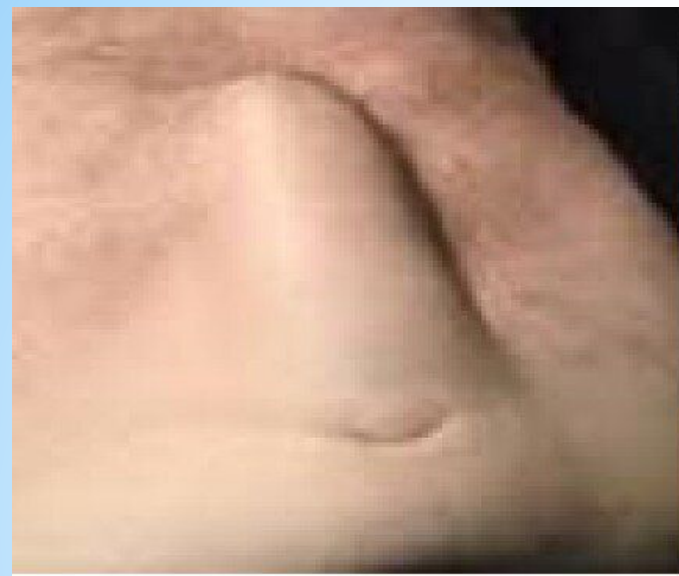
Piriformis and LBP



* **Diaphragm**

- * The adductors facilitate the PF mm and can decrease urge, but also adductor trigger points can cause general pelvic pain.
- * Coady (2009) found that 40/41 women who had vulvodynia also had hip pain had anterior labral tears. This should be screened.

*** Hip and PF pain**



1. Pelvic floor mm co facilitates the TA.
2. Pelvic floor has a piston relationship to the diaphragm.
3. Soda Can: dysfunction in any of the 4, can lead to dysfunction in the other quadrant.
4. DX clusters:
 - a. LBP, PFD and breathing disorders
 - b. Labral tears and pelvic pain
 - c. Diastasis recti, incontinence, and prolapse

 **Summary**

*PT Treatment Techniques

- * Education

- * Therapeutic Exercise

 - * Pelvic floor strengthening

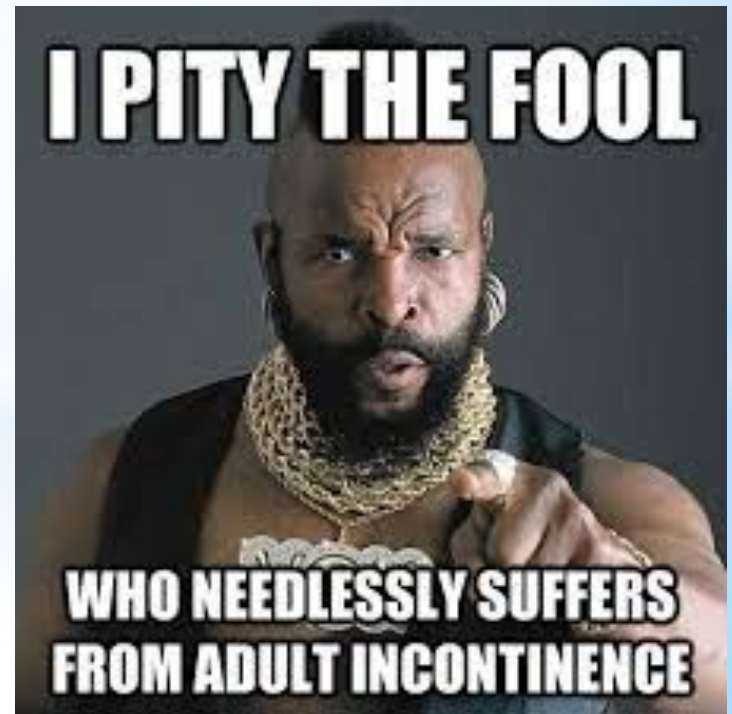
 - * 40% patients unable to perform proper PFM contraction with verbal analog (Bump 1991)

- * Manual Therapy:

 - * STM - tender and trigger points

 - * Functional dry needling

 - * Electrical stimulation



*Bladder Quieting Techniques:

- * Sit down if possible
- * Slow and low breathing
- * Do a few pelvic floor contractions to inhibit the bladder (active roll in/ roll out)
- * Visualize a quiet and peaceful place
- * Hand warming
- * **THINK OF SOMETHING ELSE!!**

***Urge Control**

- * Relaxed Awareness of Pelvic Muscles
- * Obturator and Adductor Assist Exercises
 - * Roll In with ball, Roll Out with band
- * Quick Contractions
- * Standing Plie

* Beyond Kegels Fabulous Four

- * Research has shown that there is a co-contraction of the abdominal muscles during attempts at a correct maximal contraction of the PF. Transverse muscle facilitation technique:
- * Palpate 2 cm medial and inferior to the ASIS. Draw the navel in toward the chest- “abdominal hollowing”
- * Try saying “HUT” or “SHHHH” and feel the transversus (contraction of TA causes an increase in tension not in bulge)



* **Accessory/Overflow Exercises**

* Grade 0-2

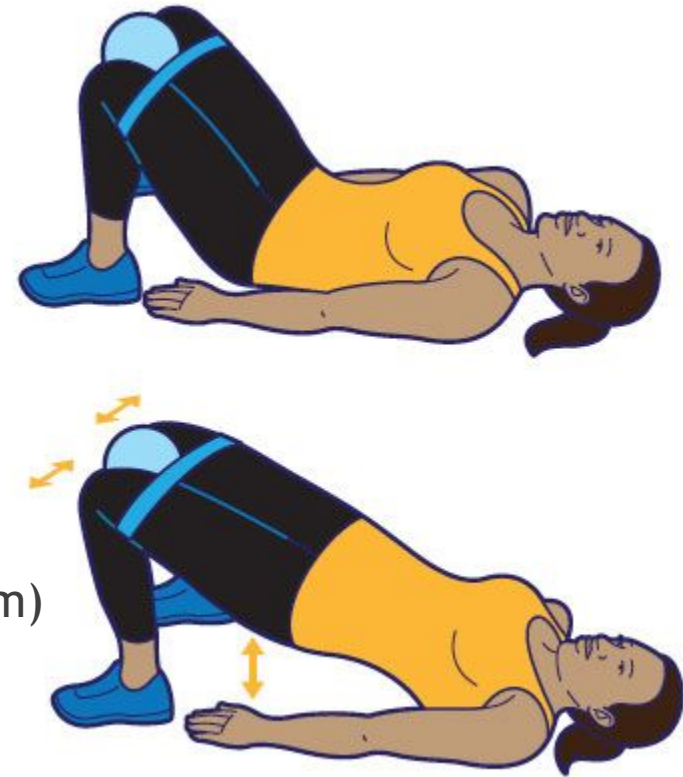
* Position appropriate - gravity eliminated

* Visual/Palpation biofeedback

* Mirror, partner feedback, finger in vagina

* Assisted exercises

* Quick stretch, overflow principle,
proprioception (finger, vaginal weight, estim)



* Sample Exercise Progression

- * Progressive Exercise with and without accessory muscles
 - * Roll In, Roll Out, transversus abdominis, and belly breathing
- * Functional Applications
 - * During all ADL's have patient lift "up and in"
 - * During sport like movements
- * Establish Maintenance Exercise Program
 - * With ADL's, after toileting, and with sexual activity

* Exercise Progression Cont.

- * A strong pelvic floor overcomes erectile dysfunction (Uni of Bristol study, 2004)
 - * a regular program of pelvic floor exercise achieves the same success rate as Viagra (Uni of Bristol study, 2004)
 - * Viagra is associated with damage to the eyes and vision in a significant number of men using it, but exercises are safe for everyone (May 2005). Medications are much more costly than an exercise program.
- * PF exercise can:
 - * "increase awareness of sexual sensations and enhance enjoyment" (Impotence Association, UK)
 - * Bring a dramatic improvement for men who experience dribbling after urinating (Uni of Bristol study, 2005)
 - * pelvic floor exercises are recommended for men following a prostatectomy.

*** Specifically Men**

- Luginbuehl, Helena et al. “Pelvic floor muscle electromyography during different running speeds: an exploratory and reliability study.” *Archives of gynecology and obstetrics* vol.293,1 (2016): 117-124.
- Nygaard I.E.: “Does prolonged high-impact activity contribute to later urinary incontinence? A retrospective cohort study of female Olympians”. *Obstet. Gynecol.*, 1997, 90, 718
- Bø K., Stien R., Kulseng-Hanssen S.: “Clinical and urodynamic assessment of nulliparous young women with and without stress incontinence symptoms: a case control study”. *Obstet. Gynecol.*, 1994, 84, 1028.
- Miller J.M., Ashton-Miller J.A., De Lancey J.: “A pelvic muscle precontraction can reduce cough-related urine loss in selected women with mild SUI”. *J. Am. Geriatr. Soc.*, 1998, 46, 870.
- Rodríguez-López ES, Calvo-Moreno SO, Basas-García Á, Gutierrez- Ortega F, Guodemar-Pérez J, Acevedo-Gómez MB. Prevalence of urinary incontinence among elite athletes of both sexes. *J Sci Med Sport*. 2021;24(4):338–44. <https://doi.org/10.1016/j.jsams.2020.09.017>.
- Dockter, M., Kolstad, A., & Martin, K. Schiwal, L. Prevalence of Urinary Incontinence: A Comparative Study of Collegiate Female Athletes and Non-Athletic Controls. *Journal of Women’s Health Physical Therapy*. 2007. 31:1.
- Irion J, Irion, G. *Women’s health in physical therapy*. Lippincott Williams and Wilkins. Baltimore, MD. 2010.
- Nygaard I, Thompson, FL, Svengalis SL, et al. Urinary incontinence in elite nulliparous athletes. *Obstet Gynecol*. 1994; 84:183-7.
- Dockter, M., Kolstad, A., & Martin, K. Schiwal, L. Prevalence of Urinary Incontinence: A Comparative Study of Collegiate Female Athletes and Non-Athletic Controls. *Journal of Women’s Health Physical Therapy*. 2007. 31:1.
- Dockter, M., Becker, E, Huber, C, Lacher, J, Obeng, L. Prevalence or Urinary Incontinence in HS Females: Implications for Prevention and Wellness Education *JWHPT*. Jan 2008.
- Hay J.: “Citius, altius, longius (faster, higher, longer): the biomechanics of jumping for distance”. *J. Biomech.*, 1993, 26, 7.
- Nygaard I.E.: “Does prolonged high-impact activity contribute to later urinary incontinence? A retrospective cohort study of female Olympians”. *Obstet. Gynecol.*, 1997, 90, 718.
- Culleton-Quinn, E., Bø, K., Fleming, N. *et al*. Elite female athletes’ experiences of symptoms of pelvic floor dysfunction: A systematic review. *Int Urogynecol J* 33, 2681–2711 (2022). <https://doi.org/10.1007/s00192-022-05302-6>
- Lee, D., & Lee, L. J. (2004, November). Stress urinary incontinence—a consequence of failed load transfer through the pelvis. In 5th world interdisciplinary congress on low back and pelvic pain, Melbourne.
- Hulme, J. *Beyond Kegels: Fabulous Four Exercises & More to Prevent & Treat Incontinence*. 2nd Ed. 2002.

- * Neumann, P., & Gill, V. (2002). Pelvic floor and abdominal muscle interaction: EMG activity and intra-abdominal pressure. *International Urogynecology Journal*, 13(2), 125- 132.
- * Massery, M. (2006). Multisystem consequences of impaired breathing mechanics and/or postural control. *Cardiovascular and Pulmonary Physical Therapy Evidence and Practice*, ed, 4(4), 695-717.
- * Solomon, L. B., Lee, Y. C., Callary, S. A., Beck, M., & Howie, D. W. (2010). Anatomy of piriformis, obturator internus and obturator externus: implications for the posterior surgical approach to the hip. *The Journal of bone and joint surgery*. British volume, 92(9), 1317-1324
- * Coady, D., Futterman, S., Harris, D., Shah, M., & Coleman, S. (2009). The relationship between labral tears of the hip and generalized unprovoked vulvodynia. Meeting abstracts. *J Low Genit Tract Dis*, 13(5), S1-28
- * Vleeming, A., Albert, H. B., Östgaard, H. C., Stuessen, B., & Stuge, B. (2008). European guidelines for the diagnosis and treatment of pelvic girdle pain. *European Spine Journal*, 17(6), 794-819.
- * Smith, M. D., Russell, A., & Hodges, P. W. (2006). Disorders of breathing and continence have a stronger association with back pain than obesity and physical activity. *Australian Journal of Physiotherapy*, 52(1), 11-16.
- * Eliasson, K., Elfving, B., Nordgren, B., & Mattsson, E. (2008). Urinary incontinence in women with low back pain. *Manual therapy*, 13(3), 206-212.
- * Douglas Lima de Abreu, Pedro Teixeira Vidinha Rodrigues, Leticia Amaral Corrêa, Adriana de Carvalho Lacombe, Dianne Andreotti & Leandro Alberto Calazans Nogueira (2019) The relationship between urinary incontinence, pelvic floor muscle strength and lower abdominal muscle activation among women with low back pain, *European Journal of Physiotherapy*, 21:1, 2-7.
- * Dufour, S., Vandyken, B., Forget, M. J., & Vandyken, C. (2018). Association between lumbopelvic pain and pelvic floor dysfunction in women: A cross sectional study. *Musculoskeletal Science and Practice*, 34, 47-53.
- * Smith, M. D., Coppieters, M. W., & Hodges, P. W. (2007). Postural activity of the pelvic floor muscles is delayed during rapid arm movements in women with stress urinary incontinence. *International Urogynecology Journal*, 18(8), 901-911.
- * Dumoulin C, Cacciari LP, Hay-Smith EJC. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. *Cochrane Database Syst Rev*. 2018;10.
- * Louis-Charles, Kaina et al. “Pelvic Floor Dysfunction in the Female Athlete.” *Current sports medicine reports* vol. 18,2 (2019): 49-52.
- * Bump, R C et al. “Assessment of Kegel pelvic muscle exercise performance after brief verbal instruction.” *American journal of obstetrics and gynecology* vol. 165,2 (1991): 322-7; discussion 327-9. doi:10.1016/0002-9378(91)90085-6.
- * Dorey, Grace et al. “Randomised controlled trial of pelvic floor muscle exercises and manometric biofeedback for erectile dysfunction.” *The British journal of general practice : the journal of the Royal College of General Practitioners* vol. 54,508 (2004): 819-25. Dorey, Grace et al. “Pelvic floor exercises for treating post-micturition dribble in men with erectile dysfunction: a randomized controlled trial.” *Urologic nursing* vol. 24,6 (2004): 490-7, 512.