

P E L V I C O N

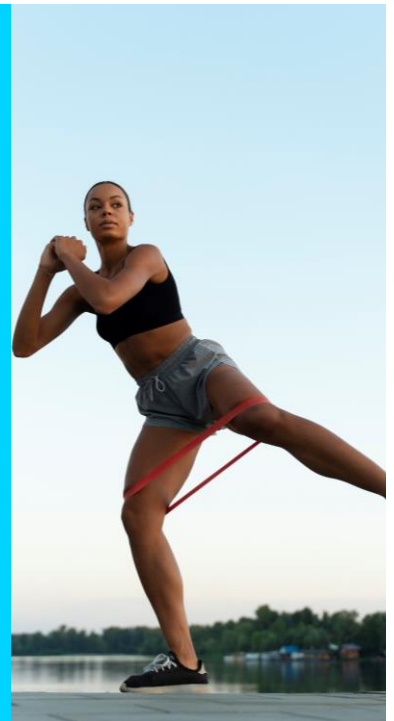
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A biopsychosocial approach to returning to sport and exercise postpartum

Gráinne Donnelly



P E L V I C O N



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Gráinne Donnelly



PELVICON

About Me

- Advanced Physiotherapist pelvic health
- Doctoral Researcher at Cardiff Met' University
- POGP Board Trustee
- Editor-in-Chief for the *Journal of Pelvic Obstetric and Gynaecological Physiotherapy (JPOGP)*
- Specialist Advisory Board for the Active Pregnancy Foundation
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Financial Disclosures

- 2023 Pelvic, Obstetric and Gynaecological Physiotherapy 'Dr Jo Laycock' research grant recipient
- 2023 World Rugby funding – postpartum guideline working group



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Equality, diversity, belonging disclosure

The contents of this presentation refer to any postpartum person regardless of age, race, sexual orientation, gender identity, birth practices, beliefs or origin.

If I use the words female or women, I refer to the research they were sourced from and or the associated biological sex origin regardless of gender identity.



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Hot topic!

Return to sport and exercise postpartum is an important and commonly discussed topic for several reasons:

- Alarming absent research base and guidance
- Public health priority – high risk time for a sharp decline in physical activity
- The rise of the ‘Mother-Athlete’
- Improved health-literacy and self-advocacy



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Getting down and dirty with the stats!

Birth rate and prevalence

- Global birth rate = 18.5 births /1000 people (4.3 births/second)¹
- Average number of children - 2.3²
- 49-51% of global population assigned female at birth³

Important information

- Physical activity is observed to ↓ during pregnancy and may not return to baseline⁴
- Only 1/3 perinatal women received postpartum physical activity guidance⁵

(1,2- Stasista 2023; 3 – Ritchie&Roser 2024; 4 – Borodulin et al 2009; 5 – Donnelly et al 2022)



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Pelvic Floor Dysfunction (PFD)

- Pregnancy/childbirth ↑ risk of PFD^{6,7}
- PFD create barriers to sport and exercise^{8,9}
- PFM training has Level 1 evidence for prevention and management of PFD symptoms ~ UI and POP¹⁰⁻¹²
- Guidance on PFMT is not adequately landing with the people who need it!

6 –DeLacey et al 2008; 7- DeLancey et al 2024; 8,9 - Dakic et al 2021a, 2021b; 10 – Dumoulin et al 2018; 11 – Woodley et al 2020; Hagen et al 2017



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Postpartum abdominal wall

Approx. 1/3 will have persisting Diastasis Rectus Abdominis (DRA) postpartum¹³

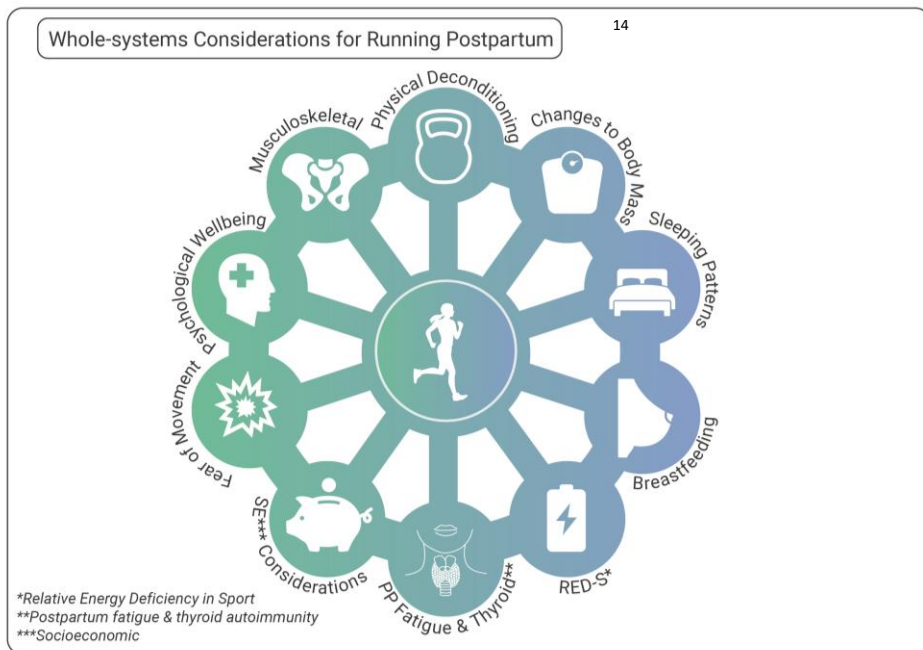
Social media confusion!

? Major abdominal wall surgery (CS)



13 – Sperstad et al 2016

9



(14 – Donnelly et al 2022)



10



Personal identity
 Accumulative Load
 Sleep
 Mental health
 Support



11

Houston, we have a problem...

- 1 in 3 women have PFD and or DRA
- Childbirth ↑ odds of both
- PFD and conflicting information reduce engagement in physical activity and exercise
- Physically active lifestyles **NECESSARY** for lifetime wellbeing
- Multitude of physiological, psychological and biomechanical changes
- ↓ guidance on return to exercise and sport postpartum
- Historically, little research focuses on female and pelvic health
- Over half the population may have reproductive potential



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Health Inequality

Example Meniscal Repair of Knee information:

What happens during surgery?

Your surgeon inserts miniature surgical instruments through other small incisions to repair the tear.

Leisure and sport

...You often need to avoid twisting on your knee, impact sports and deep squatting for 3 months **but you will be referred to Outpatient Physiotherapy after discharge where you can discuss this further.** ¹⁵

(15- The Royal Orthopaedic Hospital NHS Trust 2024)



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Versus:



Hi Mam, congratulations! After 9+ months of progressive physical, physiological and psychological bodily changes, relative deconditioning, limited education and major abdominal wall surgery and or vaginal trauma...here is your baby. You have a **NEW JOB** to go home to with immediate start. Part of your job description is to figure it all out for yourself...



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Maybe we are supposed to reduce physical activity and sport after having a baby?



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(16 – Ocobock & Lacy 2024)

Early females suited to hunting¹⁶

Prehistoric fossil remains suggest females were capable of performing the *physical task* of hunting prey and could likely hunt successfully *over prolonged periods of time*.

Research suggests that prehistoric women *didn't slow down while pregnant, breastfeeding or carrying children* - they still took part in hunting.

Physical activity and hunting were necessary for survival, regardless of biological sex.



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What made females good hunters?

Higher amounts of hormones e.g. Oestrogen and Adiponectin may have given female hunters an advantage^{17,18}

Wider hip structures likely made them able to rotate their hips and lengthen their stride to avail of speed and cheaper metabolic advantage¹⁷

© GETTY IMAGES

(17- Anderson et al 2023; Khoramipour et al 2021)



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The sedentary (r)evolution¹⁹



(19 – Freese et al 2017)

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Sedentary lifestyle (r)evolution¹⁹

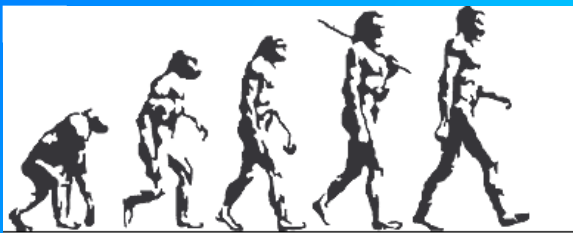
- Emergence of agriculture – lower protein, higher carb diets & increased glycemic load than typical forager diet
- Less physically active
- Less metabolic flexibility
- Increased fat storage → maternal and neonatal obesity crisis
- Increased metabolic syndromes – type II DM, cancer, cardiovascular disease, Alzheimers
- Lower load tolerance

(19 – Freese et al 2017)



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What can we learn from evolutionary science



Early homosapien lifestyle enabled all sexes to be physically capable of demanding, enduring and strenuous activity.

Early female hunters conditioned to higher levels of physical activity and associated higher pelvic floor functional reserve than modern day biological females

Early diet associated with food sparsity, non-processed, higher protein, lower carb and may have promoted lower maternal AND neonatal birth weight.

? potential for less obstetric trauma with smaller birth weight.

BUT....likely that those who had birth complications may not have survived -> natural selection, survival of fittest.



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What now for modern humans

Proactivity not reactivity

Educate younger biological females about the importance of healthy lifestyle for:

- i) improving metabolic potential (higher PA, lower fat diet)
- ii) maximising functional reserve by training their pelvic floor

Pelvic health

Prioritise PFMT during and after pregnancy

Educate about physical activity during and after pregnancy

Utilise adjuncts where appropriate*



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Reframing Return-to-Sport Postpartum: the 6 Rs Framework

This framework is underpinned by a multidisciplinary, whole-systems, biopsychosocial approach that requires the safety of the mother and baby to be the overarching consideration.



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Top tip: don't work in silos
Multi/inter-disciplinary is where it is at!



(Runners who ran during pregnancy increased their odds of running postpartum²¹)



(20 – Donnelly et al 2022; 21 – Moore et al 2021)


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This means educating and supporting the development of individuals in earlier life (healthy childhoods, educating and informing adolescents on pelvic and perinatal wellbeing and **KEEPING WOMEN ACTIVE DURING PREGNANCY**²²




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Gráinne Donnelly 2024 (22 – CSEP|SCPE 2017)

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GET ACTIVE QUESTIONNAIRE FOR PREGNANCY 
UK VERSION


NAME (≠ NAME OF PARENT/GUARDIAN IF APPLICABLE) (PLEASE PRINT): _____
 TODAY'S DATE (DD/MM/YYYY): _____ YOUR DUE DATE (DD/MM/YYYY): _____ NO. OF WEEKS PREGNANT: _____ AGE: _____

Physical activity during pregnancy has many health benefits and is generally not risky for you and your baby. But for some conditions, physical activity is not recommended. This questionnaire is to help decide whether you should speak to a healthcare professional (e.g. GP or midwife) before you begin or continue to be physically active.

Please answer YES or NO to each question to the best of your ability. If your health changes as your pregnancy progresses you should fill in this questionnaire again.

1. In this pregnancy, do you have:	
a. Mild, moderate or severe respiratory or cardiovascular diseases (e.g., chronic bronchitis)?	Y N
b. Epilepsy that is not stable?	Y N
c. Type 1 diabetes that is not stable or your blood sugar is outside of target ranges?	Y N
d. Thyroid disease that is not stable or your thyroid function is outside of target ranges?	Y N
e. An eating disorder(s) or malnutrition?	Y N
f. Twins (28 weeks pregnant or later)? Or are you expecting triplets or higher multiple births?	Y N
g. Low red blood cell number (anemia) with high levels of fatigue and/or light-headedness?	Y N
h. High blood pressure (pre-eclampsia, gestational hypertension, or chronic hypertension that is not stable)?	Y N
i. A baby that is growing slowly (intrauterine growth restriction)?	Y N
j. Unexplained bleeding, ruptured membranes or labour before 37 weeks?	Y N
k. A placenta that is partially or completely covering the cervix (placenta previa)?	Y N
l. Weak cervical tissue (incompetent cervix)?	Y N
m. A stitch or tape to reinforce your cervix (cerclage)?	Y N
2. In previous pregnancies, have you had:	
a. Recurrent miscarriages (loss of your baby before 20 weeks gestation two or more times)?	Y N
b. Early delivery (before 37 weeks gestation)?	Y N
3. Do you have any other medical condition that may affect your ability to be physically active during pregnancy? What is the condition? Specify:	
4. Is there any other reason you are concerned about physical activity during pregnancy?	

Go to Page 2 Describe Your Physical Activity Level

 © Canadian Society for Exercise Physiology (CSEP) Endorsed by and Developed in partnership with the British Association of Sport and Exercise Sciences and the Active Pregnancy Foundation. Page 1

n = 881²¹

-  **12 weeks**
Average time to return-to-running
-  **74%**
Postpartum return-to-running
-  **36%**
of those returned to pre-pregnancy levels of running

Factors influencing return-to-running postpartum

-  **Running during pregnancy**
-  **Lower fear of movement**
-  **High running volume**
-  **Vaginal heaviness**

n = 538²³

Factors for postpartum running pain

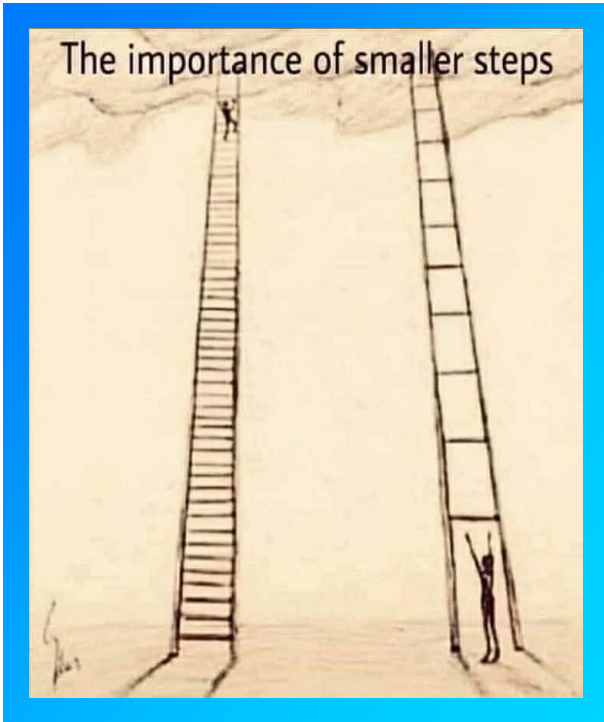
- Fatigue**
- Lack of sleep**
- Previous injury**
- Beginner runner**
- Vaginal delivery**
- Incontinence**



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(21 – Moore et al 2021; 23 – Christopher et al 2021)

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EXAMPLES OF EXERCISE PROGRESSION IN THE POSTNATAL RUNNER

Weeks Postnatal	Examples of Exercise Progression
Weeks 0-2	<ul style="list-style-type: none"> Pelvic floor muscle strength & endurance Basic core exercises e.g. pelvic tilt Walking for Cardiovascular exercise
Weeks 2-4	<ul style="list-style-type: none"> Progress walking, pelvic floor muscle care rehab Low impact aerobic cycling Low impact - cross-trainer Introduction to sports, strength & bridging in line with day-to-day requirements
Weeks 4-6	<ul style="list-style-type: none"> Low impact aerobic cycling Low impact - cross-trainer Introduction to sports, strength & bridging in line with day-to-day requirements
Weeks 6-8	<ul style="list-style-type: none"> Core mobilisation Power walking Variable low impact exercise Add dead lift Add resistance to their walk & core
Weeks 8-12	<ul style="list-style-type: none"> Introduce swimming Dependent of pelvic support & overall healing satisfactory Introduce if control table sitting on a supporting table
Week 12 & Beyond	<ul style="list-style-type: none"> Model return to training Goal specific Consider running coach Consider the factors e.g. obesity Modify according to signs & symptoms

Source - Goom T, Donnelly G & Brockwell E. Returning to running postnatal - Guidelines for medical, health and fitness professionals managing this population. March 2019

SM Sports Medicine

(24 – Donnelly et al 2019a)



25

My problem with social media...

increased media focus has helped to highlight an important women's health issue, but there is a potential risk of making something essentially normal into a health problem²⁵

(25 – Gustavsson and Eriksson-Crommert 2020)



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So how do we go from pregnancy → postpartum → to here with the pelvic floor?!

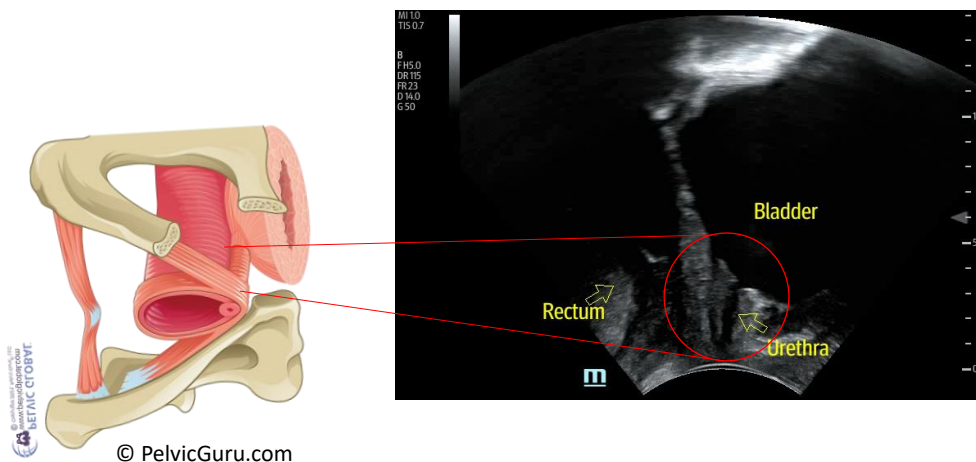


© Tianna Madison, Olympic Champion USA



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Specificity



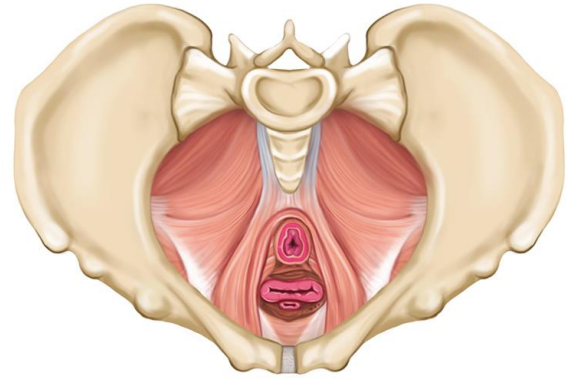
© PelvicGuru.com



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Overload

- Maximum voluntary contraction
- Rep to fatigue (usually 8-12 reps)^{26, 27}
- Add resistance - digital, vaginal weights, gravity etc²⁸



(26 – Donnelly & Moore 2023; 27 - Bø et al 2024; 28 – Fleck & Kraemer)

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Progression

Progress load (gravity, additional resistance, impact)

Progress volume

Progress intensity

Progress performance



©Celeste Goodson, ReCore Fitness



Side Jacks



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Screen for PFD²⁹

INSTRUCTIONS

Check the box whether symptoms are reported and items are satisfied.
Score 1 point for each one.



SYMPTOMS



Do you ...

- Usually experience urine leakage?
- Usually experience urinary urgency (that is a strong sensation of needing to go to the bathroom) usually accompanied by frequent urination and nocturia?
- Usually have a bulge or something falling out that you can see or feel in your vaginal area?
- Usually lose stool or gas beyond your control?
- Usually experience pain or discomfort in the lower abdomen or genital region?

SYMPTOM SCORE = /5

Whether none symptom is reported, you may proceed to the next section.

ITEMS

Clinical characteristics

<input type="checkbox"/> BMI < 18.5	<input type="checkbox"/> Menopause
<input type="checkbox"/> BMI > 30	<input type="checkbox"/> Hormonal therapy, oestrogen deficiency states
<input type="checkbox"/> Childbirth	<input type="checkbox"/> Irregular menstrual cycle
<input type="checkbox"/> Type of delivery: vaginal birth	<input type="checkbox"/> Constipation
<input type="checkbox"/> Diabetes mellitus	<input type="checkbox"/> Nerve, muscle damage, tissue disruption (pelvic floor)
<input type="checkbox"/> Connective tissue disease	<input type="checkbox"/> Pelvic surgery, radiation
<input type="checkbox"/> Hypermobility syndrome	<input type="checkbox"/> History of urinary tract infections (LUTS)
<input type="checkbox"/> Eating disorders	<input type="checkbox"/> Family history of urinary incontinence (UI)
<input type="checkbox"/> Relative energy deficiency in sport (RED-s)	<input type="checkbox"/> Family history of pelvic organ prolapse (POP)
<input type="checkbox"/> Musculoskeletal disorders (e.g. Low back pain, hip pain)	
<input type="checkbox"/> Medications (e.g. psychotropic medications, ACE inhibitors, diuretics)	

Sports-related characteristics

<input type="checkbox"/> Years of training/sport practice ≥ 9	<input type="checkbox"/> High-level sports/Athlete's national ranking
<input type="checkbox"/> Age at start of training < 14 years	<input type="checkbox"/> Medium-impact sports (e.g. running, football, tennis, karate)
<input type="checkbox"/> Training hours/day ≥ 2	<input type="checkbox"/> High-impact sports (e.g. volleyball, basketball, gymnastics, powerlifting)
<input type="checkbox"/> Training hours/week ≥ 8	
<input type="checkbox"/> Training frequency/week ≥ 4	

TOTAL ITEM SCORE = /28

CREDITS TO: GIAGIO S, SALVIOLI S, INNOCENTI T, GAVA G, VECCHIATO M, PILLASTRINI P, TUROLLOLA A.

(29 – Giagio et al 2023)




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Screen for PFD²⁹

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(29 – Giagio et al 2023)



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Sports Medicine and the Pelvic Floor²⁶

CSMR Article of the Year 2023

- Open access applied review

Table 2.

Red flag signs and symptoms.

Red Flag	Signs and Symptoms
Potential serious pathology	<p>Pelvic masses Neurological signs and symptoms including, but not limited to, cauda equina: reduced saddle sensation, loss of urinary urge, loss of fecal control, widespread neurological signs and symptoms</p> <p>Suspected cancer (bladder, bowel, cervical, vulva) – screen for established cancer related signs including unremitting night pain, night sweats, unexplained mass/growths, skin lesions, weight loss or gain, neurological signs. In addition, be aware of gynecological-related symptoms including excessive abdominal bloating, feeling of fullness early with eating, and unexplained vaginal bleeding</p> <p>Persisting vaginal bleeding</p> <p>Persisting urinary retention or any postpartum urinary retention</p>
Indicating onward referral for specialist management	<p>Psychosexual trauma</p> <p>Suspected endometriosis</p> <p>Fistula</p> <p>Suspected dermatological presentations, e.g., lichen sclerosis</p> <p>Missed or poorly healing obstetric anal sphincter injury</p> <p>Heavy, painful, or clotting menstrual bleeding</p>
Other potential medical sources of presenting symptoms of PFD	<p>Urinary tract infection</p> <p>Thrush or bacterial vaginal infection</p> <p>Diabetes</p> <p>Sexually transmitted infection</p> <p>Inflammatory bowel or bladder issues</p>

NB Red Flags refer to other sources of presenting symptoms that require further investigation and/or medical management.



(26 – Donnelly et al 2023)

Gráinne Donnelly 2024

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INSTRUCTIONS

Check the box whether the symptoms are reported and items are satisfied. Score 1 point for each one.

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TOTAL ITEM SCORE = /28

CREDITS TO: GIAGIO S, SALVIOLI S, INNOCENTI T, GAVA G, VECCHIATO M, PILLASTRINI P, TURIOCCA A.

Screen for PFD

? Load and impact testing^{30,31}:

- Walking 30 minutes**
- Single leg balance 10 seconds**
- Single leg squat 10 reps each side**
- Jog on the spot 1 minute**
- Forward bounds 10 reps**
- Hop in place 10 reps each leg**
- Single leg 'running man' 10 reps each side**

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(30 – Goom et al 2019; Christopher et al 2023)

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INSTRUCTIONS

Check the box whether symptoms are reported and items are satisfied.
Score 1 point for each one.

PFD
SENTINEL

SYMPTOMS

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Consensus statement

Clinical and exercise professional opinion of return-to-running readiness after childbirth: an international Delphi study and consensus statement

Shefall Mathur Christopher^{1, 2}, Gráinne Donnelly³, Emma Brockwell⁴, Kari Bo^{5, 6}, Margie H Davenport⁷, Marlize De Vivo^{8, 9}, Sinead Dufour¹⁰, Lori Forner¹¹, Hayley Mills⁸, Isabel S Moore³, Amanda Olson¹², Rita E Deering^{13, 14}

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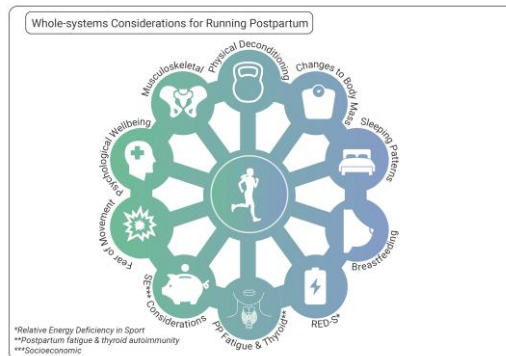
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Table. Key Clinical Considerations for Managing Postpartum Return-to-Running Using a Whole-Systems Approach

Key Clinical Reasoning Questions	Outcome
1. Are there signs of physical deconditioning?	Yes/no
2. Is BMI >30 Kg·m ⁻² ?	Yes/no
3. Is sleep quality an issue?	Yes/no
4. If breastfeeding, are there any concerns, breast pain, or unexplained lumps?	Yes/no
5. Is joint hypermobility present? (Beighton Score >5/9 as part of a wider clinical evaluation)	Yes/no
6. Using REDS-CAT, does she present with signs of RED-S?	Yes/no
7. Are there signs of postpartum fatigue or potential postpartum thyroiditis?	Yes/no
8. Using 11-item Tampa Scale for Kinesiophobia have you highlighted any FOM?	Yes/no
9. Is running being used as a coping strategy?	Yes/no
10. Have you identified signs of postpartum depression/negative mental health/birth trauma? (Consider Edinburgh Postnatal Depression Scale or Clinician-Administered PTSD Scale)	Yes/no
11. Did you identify a lower socioeconomic background?	Yes/no
12. Are there concerns related to musculoskeletal recovery?	Yes/no
13. Total number of "yes" outcomes needing clinical consideration	/12

Abbreviations: BMI, body mass index; FOM, fear of movement; PTSD, posttraumatic stress disorder; REDS-CAT, relative energy in sport clinical assessment tool; RED-S, relative energy deficiency in sport.

Don't forget whole-system's considerations¹⁴



(14 – Donnelly et al 2022)

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Utilise available resources³²

(AIS 2019)

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Sport specific consideration!^{33,34}

Getting Pelvic Floor 'Ready' for Rugby

(33 – Donnelly et al 2024a; 34 – Donnelly et al 2024b)



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Sport specific consideration!



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(35 – England Rugby 2023; 36 - Donnelly 2024c)

Player Welfare Volume 4 51

THE PELVIC FLOOR FOR CAMOGIE PLAYERS

Pelvic floor dysfunction, management and preventative measures (For Players and wider match officials)

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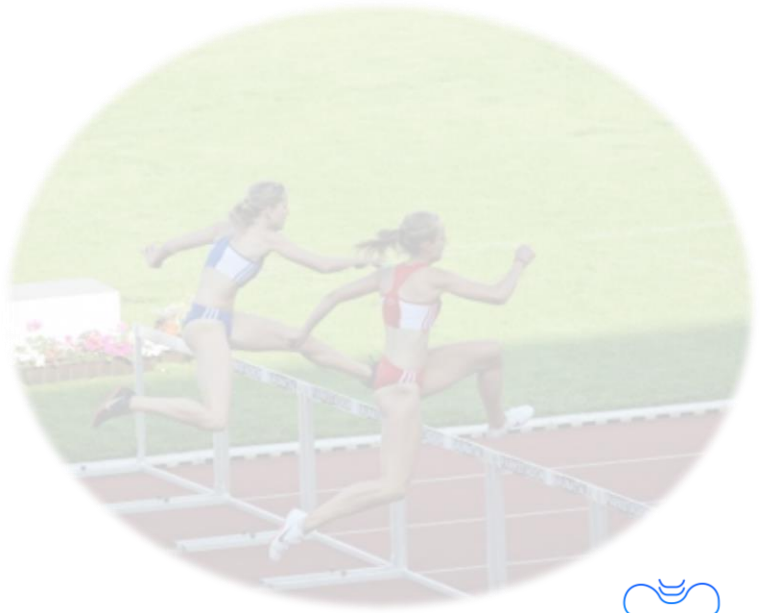


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Uniforms...³³



(26 – Donnelly et al 2023)



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Applied Examples - podcast episodes

Reframing Return-to-Sport Postpartum: the 6 Rs Framework



Apple Podcasts Preview



Bringing the 6Rs to life – a patient perspective of return to sport post-partum. Ep #498

BJSM Podcast

Medicine

[Listen on Apple Podcasts](#)

In this podcast Grainne Donnelly, Associate Prof Izzy Moore and Dr Brooke Patterson speak with Steph about her experience returning to sport post-partum using the 6Rs framework. (<https://pubmed.ncbi.nlm.nih.gov/34836883/>).

Listen to Part 1 first: https://soundcloud.com/bjispodcasts/bjism-11022022-ep-497?in=bjispodcasts/sets/bjism-1&utm_source=clipboard&utm_medium=text&utm_campaign=social_sharing where Izzy and Grainne discuss the framework and the role of a musculoskeletal clinician.

34 min

PLAY

Why did no one tell me? The Female Athlete Edition with Olympian long distance runner Kara Goucher At Your Cervix

Transitioning from Athlete to Mother Athlete with USA Olympian Tianna Madison At Your Cervix



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So, in simple terms we....

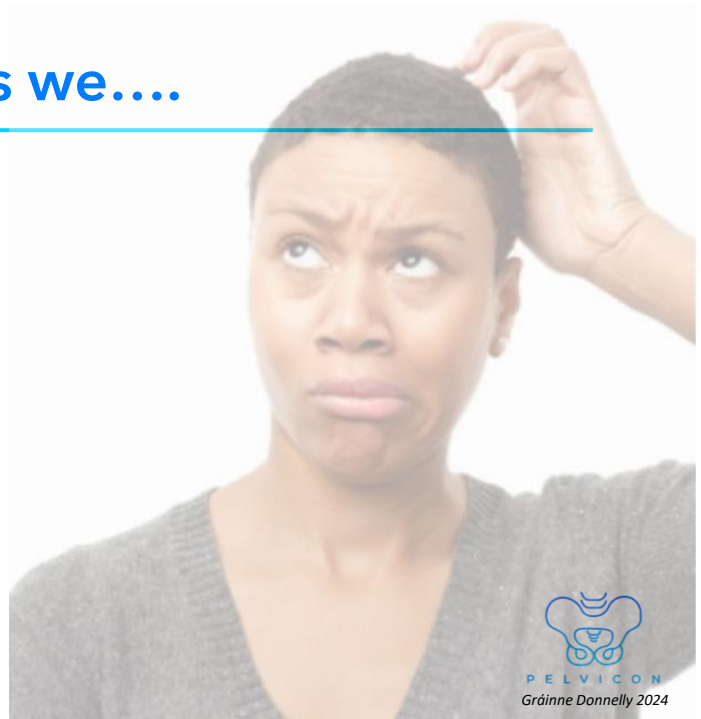
Screen

Signpost (or treat)

Risk assess*

Educate

Monitor



Gráinne Donnelly 2024

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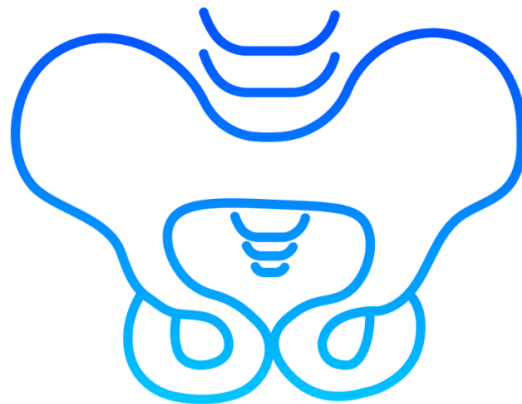
Key take-aways



- Do better for postpartum population:
research | disseminate | educate | guide
- Not just pelvic floor, remember **whole-systems**
- Strive for early hunter capability! **Lifestyle (r)evolution urgently required**
- **Gradual, individually-guided** return to activity and sport
- **Pro-active** not re-active!



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P E L V I C O N

46

Navigating Pelvic Neurology: Diagnostic Strategies and Evidence Based Treatments

Bill Taylor, MSc PT, Grad Dip
Adv Manip Therap (Canada)



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About Me

- Physio for over 40 years
- >25 years in Pelvic Health
- Canadian trained Manual Therapist
- Special Interest in Chronic Pelvic Pain
- Owner/Director of Clinic in Edinburgh
- Visiting faculty at Edinburgh Uni
- Serves on POGP Board



Bill Taylor



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Sources of Pain in the Pelvic Region



Musculoskeletal
 Lumbar Spine
 Thoracic Spine
 Pelvic Girdle
 Hip

Gastro-intestinal
 Irritable Bowel Syndrome
 Inflammatory Bowel Disease
 Constipation

Gynaecological
 Menstrual Pain
 Endometriosis
 Pelvic Inflammatory Disease

Neurological
 Pudendal
 Obturator
 Ilioinguinal
 Genitofemoral

Urological
 Urinary Tract Infection
 Bladder Disorders
 Kidney Stones

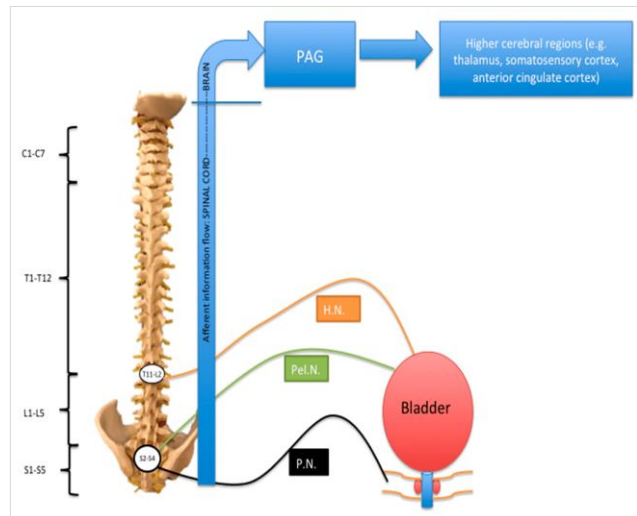


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Neurological Considerations

Autonomic Nervous System
 Sympathetic Nervous System (T10-L2)
 Para-sympathetic Nervous System (S2 - S4)
 PAG
 Higher Centers

Somatic Nervous System
 Hypogastric N
 Pudendal N
 Obturator N
 Cluneal N
 Coccygeal N
 Ilioinguinal N
 Genitofemoral N

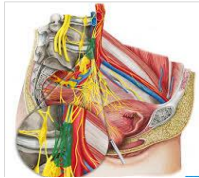


P.N.: pudendal nerve
 Pel.N.: pelvic nerve
 H.N. hypogastric nerve
 PAG: periaqueductal grey area

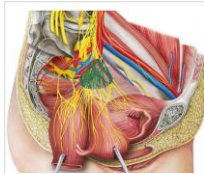
(Roy et al 2018)

50

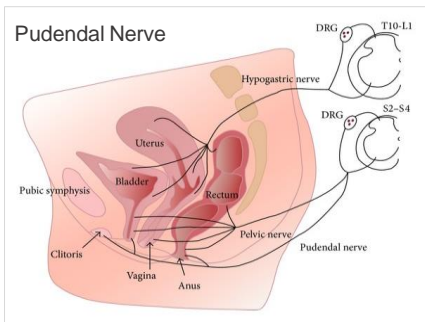
Innervation of Pelvic Organs



Superior Hypogastric Plexus



Inferior Hypogastric Plexus



Origoni et al 2014

Superior Hypogastric Plexus (SHP)

Pre-Sacral Nerve
 Anterior to L5 VB & Sacral Promontory.
 Midline abdomen anterior to Aorta
 Aortic plexus
 Lumbar splanchnic nerves (L3, L4, **Sympathetic**)
 Pelvic splanchnic nerves(S2-S4, **Parasympathetic**)

Distal Colon & Ureter, Bladder, Reproductive Tract, Glands

Males: Epididymis, Vas Deferens, Prostate, Seminal Vesicles

Females: Uterus, Fallopian Tubes, Ovaries, Vagina.

Inferior Hypogastric Plexus

Paired collection of Nerve Fibres
 Each side of Vagina/Rectum
 Pelvic Splanchnic N (S2-4, **Sympathetic**)
 Sacral Splanchnic N (T10-L2, **Parasympathetic**)
 Superior Hypogastric Plexus

Rectum, Distal Ureter, Urinary Bladder Vas Deferens, Prostate, Seminal Vesicles
 Uterus Fallopian tubes , Ovaries, Vagina

(Moore,2014:Standring 2016)

Sacral Plexus (Anterior Rami)

L4-5 to S1-4)
 Sciatic Nerve (L4-S3)
 Sup Glut N (L4-5, S1)/Inf Gluteal N (L5, S1-2)
 Posterior Fem Cutaneous (Post Rami S1-2)
 Coccygeal N (Conus Medullaris)
 Obturator N (L2-4)
 Genitofemoral N (AR L1-2)
 Ilioinguinal N (L1)
 Iliohypogastric N (L1)
 Pudendal N (S2-4)

Hypogastric Nerves (branch of SHP)

Anterior surface of the sacrum
 Connect the SHP to Inferior Hypogastric Plexii
 HN Fibres join the Pelvic Splanchnic Nerves
 Form the ipsilateral Inferior Hypogastric Plexus (IHP)
 Primary **Sympathetic** source to the IHP

Pelvic Splanchnic Nerves are **Parasympathetic** Source

Rectum, Bladder, Prostate, Seminal Glands, Cervix & Vagina



PELVICON

51

What is Peripheral Neuropathy?



Disease/injury affecting a peripheral nerve
 S&S depend on nerve type
 Motor
 Sensory
 Autonomic
 Acute or Chronic

Most common causes:

- o Diabetes
- o Autoimmune diseases
- o Alcoholism
- o Trauma
- o Nutrient deficiency



Mononeuropathy

Single nerve damage
 Trauma most common cause

Polyneuropathy

Diabetes

Sensory nerve damage	Motor nerve Damage
----------------------	--------------------

- | | |
|-------------------|------------------|
| o Numbness | o Weakness |
| o Imbalance | o Impaired gait |
| o Burning/itching | o Muscle atrophy |



PELVICON

52

What is an Entrapment Neuropathy?



Compression and/or irritation of peripheral nerves travelling through narrow anatomical spaces.

Most common entrapment neuropathy: carpal tunnel syndrome

Carpal tunnel syndrome

- o Lifetime risk of 10%
- o 84% in patients with diabetes (Scmid et al 2020)



Sciatica has reported prevalence from 1.6% - 43%
Large variation in prevalence attributed to the varying definitions of 'sciatica'

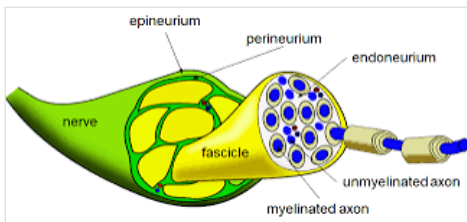
Sciatica may include:

<p>Somatic referred pain Arises from one body area, felt in another</p>	<p>Radicular pain Pain evoked by eptopic discharges from a dorsal root or ganglion</p>	<p>Radiculopathy Conduction block along a spinal nerve or its roots.</p> <ul style="list-style-type: none"> o Clinical manifestations o reflexes o Myotomal weakness
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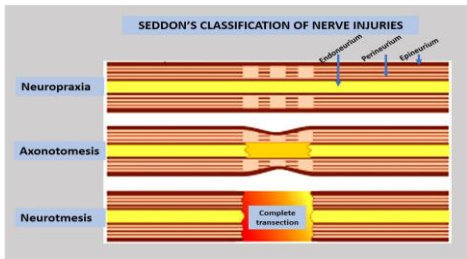
Nerve Structure and Damage



A peripheral nerve has x3 connective tissue compartments:

- o Epineurium
- o Perineurium
- o Endoneurium

Acts as shielding barriers for the impulse-conducting elements



Nerve injuries classified into x3 broad categories :

- o **Neurapraxia:** no loss of nerve continuity, transient functional loss of function
- o **Axonotmesis:** damage to axon preservation of perineurium and epineurium
- o **Neurotmesis:** complete transection of the nerve -complete functional loss.

(Bhandari, 2019)



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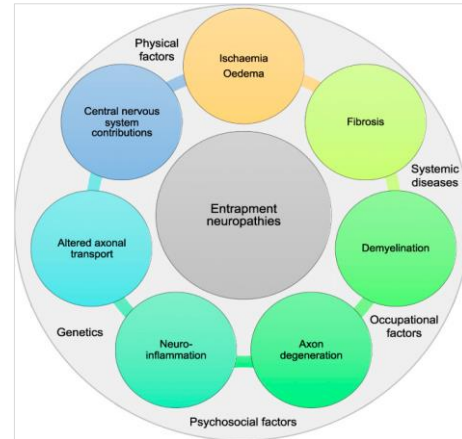
Pathophysiology of Entrapment Neuropathy

Understanding Neuropathic pain based on pre-clinical models

Involving acute & severe nerve injuries

(Schmid et al 2020)

- Entrapment neuropathies are distinct from preclinical models
- Onset is mostly slow
- Neural injury is often mild but chronic



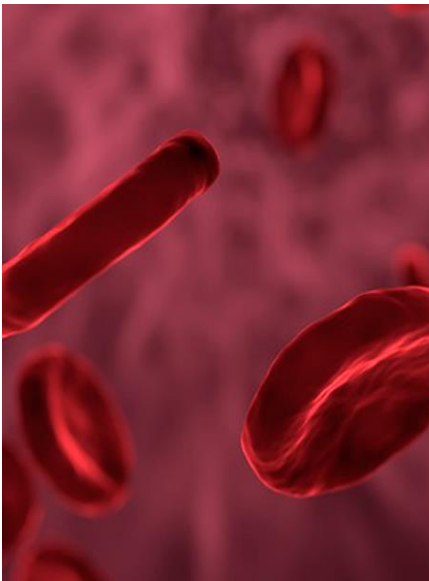
Potential Patho-mechanisms and risk factors contributing to entrapment neuropathies.



PELVICON

55

Ischaemia, Odema, and Intraneural Fibrosis in Neuropraxia



Intraneural Ischaemia

Typical of mild entrapment neuropathies

- Extra-neural pressures 20 to 30 mm Hg disrupt intraneural venous circulation
- These pressures often reached in patients with entrapment neuropathies
 - Reverses the pressure gradient necessary to assure adequate Nerve blood supply
- Could explain Intermittent Paraesthesia:
 - Occurring at night
 - Static positions
 - End of range movement

Prolonged Ischaemia

Can compromise the blood nerve interface

- Results in subsequent oedema formation
- Neural oedema is seen as enlargement of the compressed nerves
 - Confirmed by specialised MRI sequences.
- Persistent oedema may lead to intraneural and extra-neural fibrotic changes
 - A feature of entrapment neuropathies of distal nerve trunks
- May explain the reduced gliding of human compressed nerve

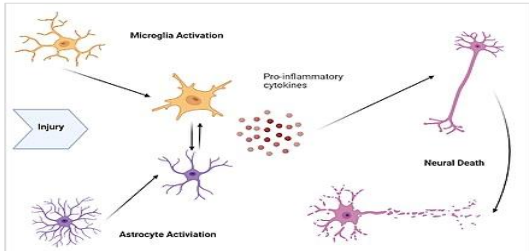
(Schmid et al 2020)



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Neuro-Inflammation



Neuro-inflammation plays a major role in the generation and maintenance of neuropathic pain

Link between Neuroinflammation and Neuropathic Pain is seen in acute & severe nerve injury models

Growing evidence that Neuroinflammation is a feature of mild chronic nerve compression

Activation of immune cells at the site of damaged axons:

- Immune cells release
- Inflammatory mediators
- Cytokines
- Chemokines
- Lipid mediators

- o Induces breakdown of the blood-nerve barrier.
- o Allows immune cell influx and swelling.
- o Sensitises injured and uninjured axons and nociceptors in target tissue.
- o Contributes to neuropathic pain initiation and maintenance.
- o Neuroinflammation does not remain restricted to the lesion site.
- o Found in associated dorsal root ganglia after peripheral nerve compression or nerve root compromise.
- o Animal models of radiculopathy demonstrate an activation of glial cells in the dorsal horn of the spinal cord



(Schmid et al 2020)

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Effects of Neuroinflammation



Assessment

Local and remote immune inflammation confirmed in patients with lumbar radicular pain using combined PET/MRI



Neuroinflammation

Remote neuroinflammation could explain the spread of symptoms beyond affected dermatomes or innervation territories

↓
Epineural inflammation sensitises the Nervinervorum. It may induce spontaneous/evoked activity in nociceptive axon

↓
May result in mechanical hypersensitivity. Despite the absence of frank axonal damage



Compression

Mild experimental nerve compression induces an inflammatory reaction within the epineurium

Extra-neural mechanisms explain why patients with entrapment neuropathies have predominantly nociceptive symptoms

- o Inflammation of surrounding tissue
- o Ischaemia
- o Fascial & muscle pain. (Schmid et al 2020)



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Aetiology of Entrapment Neuropathy (EN)

Aetiology of EN remains largely unknown

Several risk factors shared across conditions:

- Increased body mass index
- Occupational or physical factors
- Predisposing diseases- diabetes or hypothyroidism

Genetic predisposition appears to be one of the strongest risk factors

- Genome studies have identified several genes that increase susceptibility for EN - mainly Carpal Tunnel Syndrome
- Many of the genes are related to connective tissue and extracellular matrix architecture
- Remains unclear whether these genes increase vulnerability to EN by:
 - Altering the nerve itself (as a substantial proportion consists of connective tissue)
 - Altering the environment (osseo-fibrous tunnels) through which the nerve travels

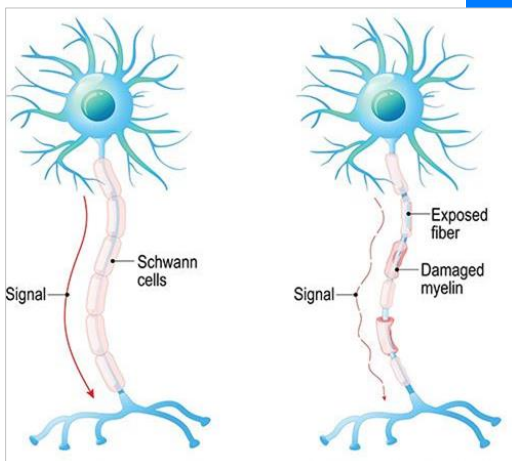
(Schmid et al 2020)



PELVICON

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Demyelination and Axon Degeneration



Prolonged Ischaemia

- Causes mechanical compromise.
- Produces demyelination and axon degeneration.

Architectural Changes of nodes of Ranvier after nerve compression

Down regulation and Upregulation of existing ion channels

Expression of **novel channels**

Channel changes implicated with **spontaneous ectopic generation of action potentials**

May contribute to spontaneous electric shock-like pain or symptoms provoked with Tinel testing

Focal demyelination

- Hallmark of entrapment neuropathies
- Characterised by nerve conduction slowing or blocking

Ischaemia

- In absence of **demyelination** may contribute to nerve conduction changes

(Schmid et al 2020)



PELVICON

60

Pain



“ an unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage ”

The International Association for the Study of Pain - IASP (2020)

- Pain is not just physical
- Emotional and subjective experience
- Influenced by biopsychosocial factors
- Experience of pain doesn't always correlate directly with tissue damage or severity of injury



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Nociception

- Nociceptors activated by potentially noxious stimuli
- A signal arrives at the central nervous system via the stimuli
- Nociception is neural encoding and processing noxious stimuli

Nociception is a physiological process whereby:

- Body tissues are protected from damage
- Important for 'fight or flight' response
- Encourages avoiding action
- Protects us from harm in our environment

(Loeser et al 2018)



PELVICON

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Nociceptors activated by 3 types of stimulus:

Temperature (thermal)	Mechanical (stretch/strain)	Chemical (pH change)
-----------------------	-----------------------------	----------------------

- Nociception and Pain are not synonymous
- Each can occur without the other
- Nociceptive Pain = Pain arising from activation of the nociceptors
- Superficial somatic:
 - skin / superficial fascia
- Deep somatic:
 - ligaments
 - tendons
 - bones
 - muscles
 - viscera

Types of Pain



Nociceptive

Pain that arises from actual or threatened damage to non-neural tissue and is due to the activation of nociceptors



Neuropathic

Pain caused by a lesion or disease of the somatosensory nervous system



Noci-plastic

Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage nor evidence for disease or lesion of the somatosensory

Causing activation of peripheral nociceptor system causing pain
Closely connected to Central Sensitisation

(Bonezzi et al 2020;IASP 2020)



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PERIPHERAL SENSITISATION

PNs becomes more sensitive to stimuli:

- From injury or inflammation
- Prostaglandins, bradykinin, and cytokines activate and sensitize nociceptors

Leads to heightened pain responses Lowered Pain Threshold
Threshold for activation of nociceptors lowered

- Light touch/mild heat can trigger a pain response.

Resensitized nociceptors

- Stronger more frequent signals sent to the spinal cord and brain in response to stimuli.
- Hyperalgesia/Allodynia

Maintenance of Sensitization

- Ongoing unresolved inflammation or nerve injury contributes to chronic pain conditions

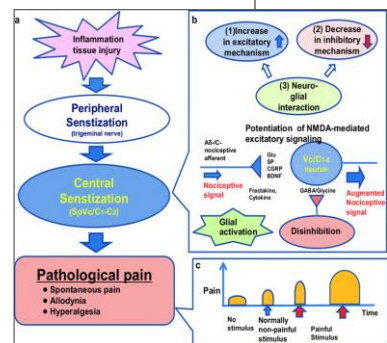
Peripheral sensitization is involved in:

- Inflammatory pain
- Neuropathic pain



CENTRAL SENSITISATION

- CNS becomes hyper-responsive to stimuli
- Prolonged/Intense Pain Signals from PNS
- Neuronal Changes - increased sensitivity to pain
- Increased neurotransmitter release
- Receptors more responsive
- Persistent pain perception
- Expansion of pain area



(Iwata et al 2017)

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ACUTE PAIN

- Short lived
- Provoked by specific disease or injury
- Serves a useful biologic purpose
- Associated with skeletal muscle spasm/sympathetic nervous system activation
- Self-limiting

CHRONIC PAIN

- Pain that persists past normal healing time
- Lacks the acute warning function of physiological nociception
- Chronic Pelvic Pain lasts or recurs ≥ 3 to 6 months

(Treede et al 2015)



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Chronic Neuropathic Pain



Caused by a lesion or disease of the somatosensory nervous system

Neuropathic pain may be spontaneous or evoked

- **Hyperalgesia** = an increased response to a painful stimulus
- **Allodynia** = a painful response to a normally nonpainful stimulus

Diagnosis of neuropathic pain usually requires a history of nervous system injury:

- Nerve trauma / diabetic neuropathy
- Neuroanatomically plausible distribution of the pain.

Diagnosis of definite neuropathic pain requires positive:

- Imaging / Biopsy/Neurophysiological/Laboratory tests

Diagnostic entities can be divided into peripheral or central neuropathic pain.

(Schmid et al 2023)



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Epidemiology of Pelvic Pain



In up to 33% of patients the source of pain not identified

Patients often labelled with a psychogenic disorder

Further increasing distress (Howard 2003; Daniels 2010)

Chronic pelvic pain (CPP) has an estimated prevalence 4-15%:

- 10% of all ambulatory gynecologist referrals
- 12% of all hysterectomies
- > 40% of all gynecological diagnostic laparoscopies

(Howard 2003)

Pelvic pain can be common throughout the reproductive ages

Premenarche or Post-menopause onset is only rarely seen

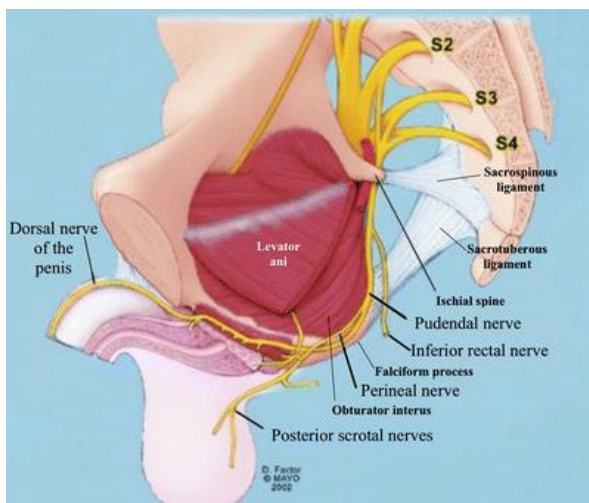


(Daniels 2010)

PELVICON

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Pudendal Nerve



Anterior Rami S2,S3 & S4

Exits pelvis via Greater Sciatic Foramen above sacrospinous ligament

Between Piriformis and Coccygeus

Re-enters Perineum via Lesser Sciatic Foramen looping around the Ischial Spine under the Sacrospinous Ligament (Moore, 2014 Standring et al 2016)

Travels through a Fascial Tunnel (Alcock's Canal) formed by fascia of Obturator Internus

Divides into 3 Branches

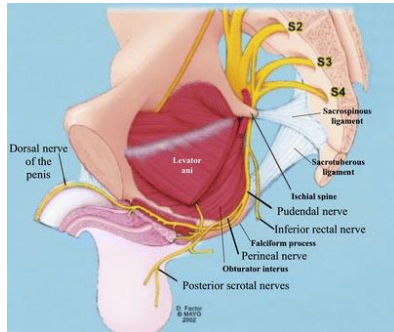
- Inferior Rectal Branch
- Perineal Branch/Vaginal Branch
- Dorsal Nerve of the Penis/Clitoral Nerve



PELVICON

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Function of the Pudendal Nerve



70% Somatic fibres (50% sensory/20% motor) 30% Autonomic fibres.

(Kinter 2024)

3 Branches

Inferior Rectal Nerve

- Efferent to the External Anal sphincter - voluntary defecation
- Afferent from the anal canal.

Perineal nerve: Superficial/Deep Branches

Superficial (sensory) Branch

- Skin over the Urogenital triangle / Posterior Scrotum / Labia

Penial/Clitoral branch

- Sensory fibres
- Critical for sexual function/pleasure
- Somatic sensations from the shaft & glans of Penis/Clitoris
- Neural pathway in Penis in producing erection.
- Autonomic connections within the lumbosacral spinal cord
- Dorsal nerve afferent fibres communicate with the Cavernal Nerves carrying parasympathetic axons
- Promotes vasodilation in both the Penis and Clitoris

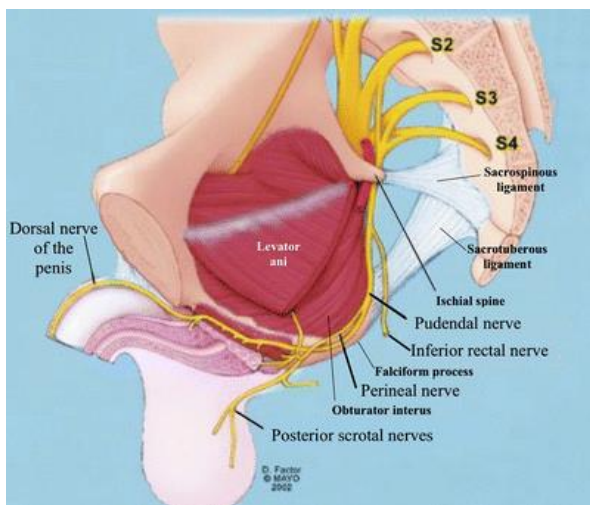
Deep (muscular) branch

- Levator Ani
- Puboccygeus
- Iliococcygeus
- Bulbospongiosus - expulsion of urine/semen/clitoral erection
- Ischioavernosus - maintaining Penile/Clitoral erection
- Superficial & Deep Transverse Perineii - stabilise peroneal body & pelvic floor
- Coordinated contractions of perineal muscles and pelvic diaphragm.
- External urethral sphincter- voluntary control of micturition



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Diagnosis of Pudendal Nerve Entrapment - Nantes Criteria



Nantes Criteria introduced 2008

Attempt to provide standard Diagnostic approach for Pudendal Neuralgia

Clinically based criteria

- 5 essential Subjective components
- Pain in anatomical region of Pudendal N
 - Worsened by sitting
 - Absence of night pain
 - No Sensory loss during clinical exam
 - Pain improved by nerve block

Positive Nerve Conduction Test

Exclusion Criteria

- Pain exclusively in
- Coccygeal
 - Gluteal
 - Hypogastric
 - Pubic Region.
 - Pruritus
 - Exclusively Paroxysmal Pain
 - Abnormal Pelvic Imaging

(Labatt et al 2008)



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Evolution of Pain Science/ MAPP Research Group



Nantes criteria limited - based on a Biomedical Model

Does not concur with Schmidt's work

New advances in pain science

MAPP have developed a new way classify patients with Pelvic Pain

Development of MAPP phenotyping

- Diagnosis and treatment pathway for patients with pelvic pain
- Supports a Biopsychosocial Approach to treatment of Pelvic Pain

(Clemens et al 2020)



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Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Research Network

Large-scale, multi-institutional initiative established by the National Institutes of Health (NIH) to study chronic pelvic pain (CPP) conditions

Clinical Phenotypes - Type/Severity/Duration/GU/GI/Sexual Dysfunction

Biological Phenotypes - Genetic/Immunologic/Inflammatory

Psychological Phenotypes - Stress/Anxiety/Depression

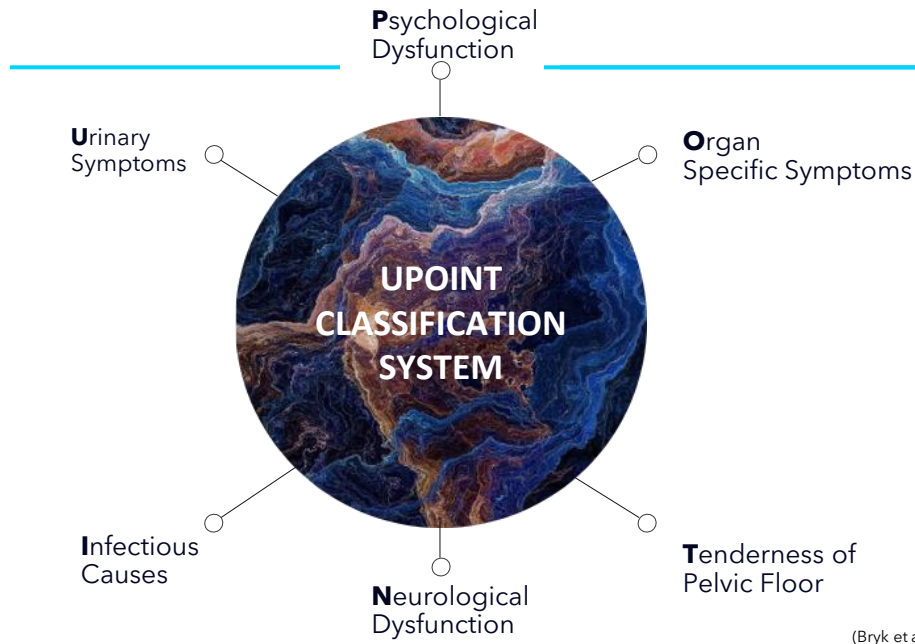
Neuro-imaging & Sensory Phenotypes - MRI

Urinary and Bladder Function - Frequency/Urgency/Pain with filling

(Clemens et al 2020)



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Aetiology of Pudendal Neuralgia



- Trauma
- Infection
- Tumor
- Child-birth
- Micro trauma from Cycling
- Diagnosis often delayed
- Often misdiagnosed

(Leslie et al, 2024)



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Symptoms of Pudendal Nerve Neuropathy

Unilateral/Bilateral
Neuropathic pain

Burning, tearing,
electrical, shooting
pain

Pins and needles

Genital numbness:

- o 50-90% cyclists
- o ED 13-24% cyclists

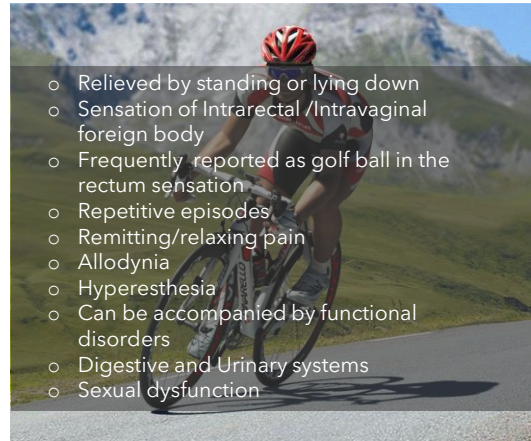
Sudden onset is common
Sensory area of Pudendal nerve
Anus to the distal/ penis or clitoris

Pain mainly perineal, but it
may spread
Groin / inner leg / buttock /
abdomen

Aggravated/triggered by sitting:

- o Car/Plane Journey
- o Cycling long distance
- o Perineal Surgery

(Leslie et al, 2024)



- o Relieved by standing or lying down
- o Sensation of Intrarectal /Intravaginal foreign body
- o Frequently reported as golf ball in the rectum sensation
- o Repetitive episodes
- o Remitting/relaxing pain
- o Allodynia
- o Hyperesthesia
- o Can be accompanied by functional disorders
- o Digestive and Urinary systems
- o Sexual dysfunction



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Management of Pudendal Nerve Neuropathy

Greatdisparity in the management PNE

(Levesque et al 2021)

Depends on the skills and techniques of clinicians available:

- o Pharmacology
- o Physiotherapy/TENS
- o Psychotherapy
- o Injections
- o Surgery
- o Pulsed radiofrequency/Neuromodulation

Literature is scarce and often contradictory

Often the language used is not standardised

Can lead to confusion with both patients and clinicians

Need for standardisation of language

(Frawley et al 2021)



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Treatment Planning Using Distress Inventories

- Allow for treatment planning based on the unique presentation of each patient.
- Central pain mechanisms are a key component that need to be assessed in pelvic pain
- Specific distress factors that may be contributing to the central pain mechanisms in the individual patient need to be identified
- Helps develop specific modality-based interventions that fit into the scope of practice for physiotherapy.

(Vandyken, 2020)



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Sadcliffs - Carolyn Vandyken

STRESS

ANXIETY. SAD -DASS21

DEPRESSION

CATASTROPHISATION -Pain Catastrophising Scale (PCS)

LOW SELF EFFICACY - Pain Self Efficacy Questionnaire-2 (PSEQ2)

LOW POSITIVE AFFECT -Positive and Negative Negative Affect Scales (PANAS)

INJUSTICE - Injustice Experience Questionnaire (IEQ)

FEAR - Tampa Scale of Kinesiophobia

SHAME/SELF COMPASSION - Harder's Personal Feelings Questionnaire-2 (PFQ-2)

SMUDGING (Body image) - Freemantle Back Awareness Questionnaire (FreeBaq)

(Vandyken, 2020)



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So, What Does PT Treatment Look Like?

Using the UPOINT system

Three domains are prominent

- Pelvic Floor Tenderness
- Neurological Dysfunction
- Psychological Issues

Myofascial Mobility

Treat non-relaxing Levator Ani & BulboSpong/IschioCavernosus

- Both internally and out

Mobilise Pudendal Nerve - reduce neuromechanical sensitivity

Pelvic Floor Muscle Training

Breathing Re-education

Up regulation of Parasympathetic Activity:

- Fight
- Run
- Freeze

Active Nerve Mobilising Strategies

Movement Strategies & Loading

Estrogen Cream/Vaginal Moisturiser

Acceptance & Commitment Therapy/Cognitive Behavioural Therapy/Coping Strategies
Novel activities -Yoga/Pilates

(Frawley et al 2021)



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Interventions Directed at Neural Mechano-Sensitivity

Neural Mobility techniques directed at neural mechano-sensitivity are the most common type of intervention studied for nerve entrapment pain

Commonly used physiotherapeutic techniques addressing neural mechano-sensitivity include

- Specific movements of peripheral nerves in relation to their surrounding tissues neural sliders or tensioners

Interface techniques that are directed at the tissue surrounding the nerve

Can be performed as exercises by the patient or as a form of manual therapy by the practitioner.

(Schmid et al 2020)



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Evidence For Use of Neural Mobilising Techniques To Reduce Mechano - Sensitivity

- Basson et al 2017
- o Grouped conditions by aetiology
 - o Neural tissue management is effective for nerve-related low back pain/nerve-related neck and arm pain No comment on whether it is superior to other interventions
- Rodriguez-Sanz et al, 2018
- o Neural tissue management reduced pain compared to no or minimal treatment. When compared to more substantial treatment - results were mixed and not enough evidence to make strong conclusions
- Varangot-Reille et al 2022
- o NM appeared effective to improve overall Pain Intensity when embedded in Physiotherapy Treatment. Better than no intervention but not superior to other treatments except for Mechano-sensitivity
- Cuenca-Martinez 2022
- o Neural mobilization treatments showed positive results on pain intensity and disability in individuals with musculoskeletal conditions. Neural mobilization should be integrated into the physical therapy management - more research is needed
- Baptista et al 2023
- o Neural mobilization as part of multimodal interventions appears to have a positive effect on pain for patients with low back pain and neck pain and on function in people with low back pain. For the other musculoskeletal conditions, results are inconclusive.



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Recent level 1 evidence for Treatment of Chronic Pelvic Pain

Starzec-Proserpio et al 2024
 Systematic review and Meta-analysis of RCTs
 Found Multimodal Physiotherapy reduces pelvic pain - high certainty of evidence
 Physical interventions

Integrated with Education/Self-management skills
 Pain-neuroscience Education
 Graded exposure
 Cognitive behavioral based approaches
 Acceptance/Coping skills
 Patient centered Frameworks



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MULTIMODAL PHYSIOTHERAPY

SELF-MANAGEMENT
SKILLS

PAIN
EDUCATION

PSYCHOLOGICALLY
INFORMED
INTERVENTIONS



EXERCISE

MANUAL
THERAPY

PELVIC FLOOR
THERAPY

PERSON-CENTERED
VALUES-BASED
GOALS

Starzec-Proserpio et al. 2024



83



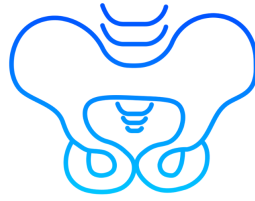
Bill Taylor



Thank you!

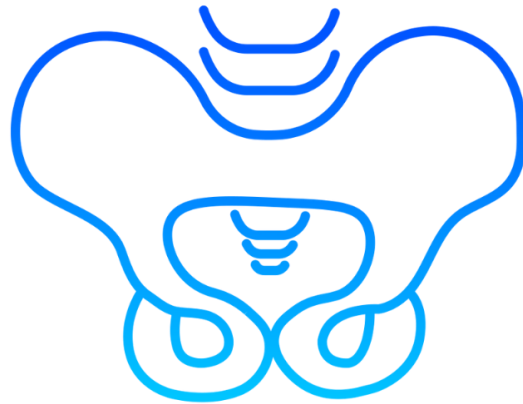
84

Q&A



P E L V I C O N

85



P E L V I C O N

86



Giveaway!




P E L V I C O N

87

Overactive Bladder Syndrome


...the Mensa Test for Pelvic Floor Rehab Providers

Taryn Hallam



P E L V I C O N

No Financial Disclosures



88

What was my goal **QUESTION** Note this talk?

simply....
Hopefully help you all **maximize your success rates, when applying conservative management options** to patients with **Overactive Bladder Syndrome!**



89

QUESTION

WHAT PERCENTAGE of your OAB patients should you be expecting to get better as a pelvic health rehab provider??



2023 Pelvicon Attendees



Now at this point I do want to acknowledge....

90

LAST YEAR AT PELVICON

1. Pelvic Organ Prolapse + /- Pessaries

2. Stress Urinary Incontinence

SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 43%
Stage I/II POP - Panman et al 2017¹

SUCCESS RATE OF PFMT FOR SUI

CURE: 33 - 55% IMPROVED: up to 75%
7th ICI published 2023²

ADD A PESSARY TO PFMT

approximately doubles the success rate
all stages: OR = 2.15 - Bugge et al - Cochrane 2020³

ADDING LIFESTYLE ADVICE; WEIGHT LOSS etc

possibly increases the rate
but we don't have good multimodal Mx research data



91

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Why do I always put these types of stats
in my presentations?



92

↓ SELF AUDIT - BENCHMARKING ↓

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SUCCESS RATE OF PFMT FOR SUI

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Why do I always put these types of stats
in my presentations?

This tells you the success rate you should be aiming to achieve as
a pelvic health rehab provider treating POP / SUI



93

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SUCCESS RATE OF PFMT FOR SUI

CURE: 33 - 55% IMPROVED: up to 75%
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SO IF WE NOW FOCUS ON OAB SYNDROME....

(as this is the focus of my talk today)

What is the percentage of patients we should be
expecting to get better with conservative management?



94

↓ SELF AUDIT - BENCHMARKING ↓

1. Pelvic Organ Prolapse +/- Pessaries

SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 43%
Surg J Int Pelvic Floor Anal Man et al 2017¹

2. Stress Urinary Incontinence

SUCCESS RATE OF PFMT FOR SUI

CURE: 33 - 55% IMPROVED: up to 75%
7th ICI published 2023²



3. Overactive Bladder Syndrome

SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 85 - 90% !!

Much HIGHER than POP or SUI!!



95

↓ SELF AUDIT - BENCHMARKING ↓

This is one of the many reasons I LOVE teaching and treating OAB!



3. Overactive Bladder Syndrome

SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 85 - 90% !!

Much HIGHER than POP or SUI!!



96

SELF AUDIT - BENCHMARKING

HOWEVER

Interestingly, I have a lot of people often say they feel their success rates for OAB aren't this high.....

The more complex patients that don't seem to get better with our standard clinical reasoning
15% of Patients

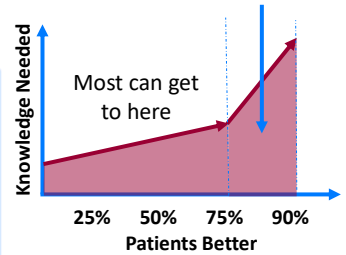
?? 60% ?? 75% but not...

3. Overactive Bladder Syndrome

SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 85 - 90% !!

Much HIGHER than POP or SUI!!



97

GOAL TODAY

Get you closer to

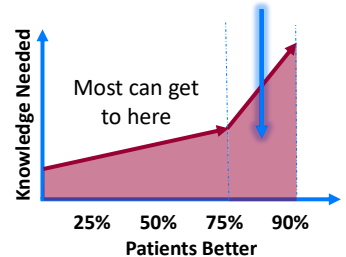


SUCCESS RATE OF CONSERVATIVE MX

Much Better or Better = 85 - 90% !!

(if you're not already...)

Through improving patient clinical reasoning for these complex patients
15% of Patients



98

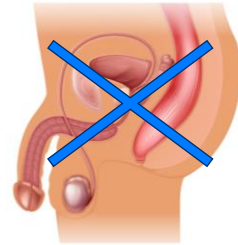
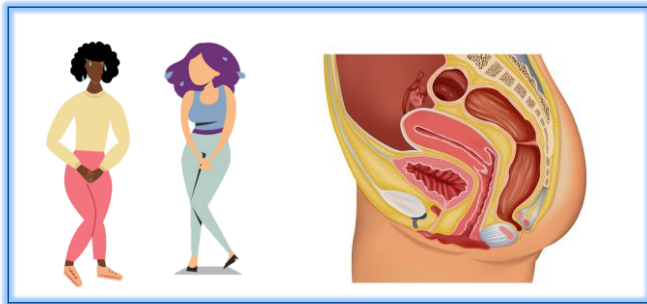
LITTLE NOTE

Due to time restrictions and the immense complexity of OAB....

THIS TALK WILL PRIMARILY BE FOCUSING ON

OAB in people assigned female at birth

not OAB in people
assigned male at birth



They often have quite different mechanisms....

and I can't do both well in 1hr 15min.



99

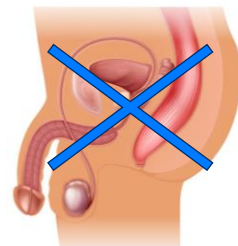
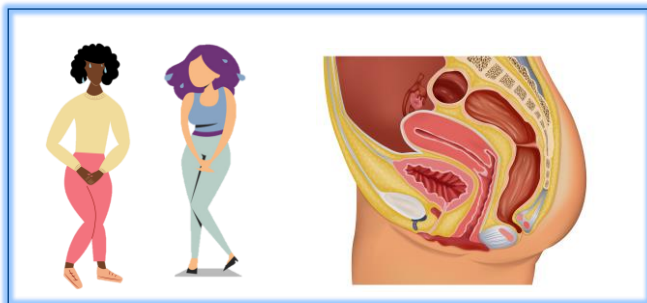
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OAB in people assigned female at birth

not OAB in people
assigned male at birth



They often have quite different mechanisms....

and I can't do both well in 1hr 15min.



100

LITTLE NOTE

Due to time restrictions and the immense **complexity of OAB....**

There is a reason why this talk has been called....

OVERACTIVE BLADDER SYNDROME

...the Mensa Test for Pelvic Floor Rehab Providers

But to clearly explain this,
(and also help you understand where we are heading over the next hour)...
bear with me whilst I now start this talk with a small activity...

101

Can I ask you all.....



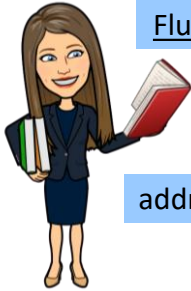
102

LITTLE NOTE

There is a whole book worth of them!!

Just take a moment to try to think of...

ALL THE POSSIBLE TREATMENT OPTIONS FOR SOMEONE WITH OAB SYNDROME



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
	increase fluid intake	address spacing fluid	eliminate bladder irritants
<u>Address Post-Void Residuals:</u>	managing constipation	addressing POP	
addressing bladder hypotonicity	<u>PFMT:</u>	down training	strength training



Just take a moment to try to think of...

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Bladder drills / Timed voiding	<u>Neuromodulation:</u>	TTNS	Vaginal stim. Sacral.
<u>+ Medical:</u>	Antimuscarinics	Topical Oestrogen	β 3 Agonists Intra-vesical Botox ...

so many options!!!
The good news...



Just take a moment to try to think of...

ALL THE POSSIBLE TREATMENT OPTIONS FOR SOMEONE WITH OAB SYNDROME



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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so many options!!!
SOMETHING SHOULD WORK 😊



105

However, this also brings up a problem....

ALL THE POSSIBLE TREATMENT OPTIONS FOR SOMEONE WITH OAB SYNDROME



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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so many options!!!
SOMETHING SHOULD WORK 😊



106

However, this also brings up a problem....

Different OAB patients need different things...




<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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<u>Address Post-Void Residuals:</u>	managing constipation	addressing POP	
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107

However, this also brings up a problem....

One OAB patient might need to....



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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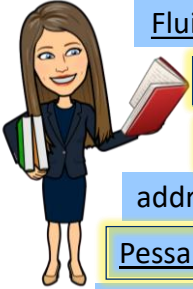


However....

108

However, this also brings up a problem....

another OAB patient will need to....




<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
	increase fluid intake	address spacing fluid	eliminate bladder irritants
<u>Address Post-Void Residuals:</u>	managing constipation	addressing POP	
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			strength training
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109

in contrast....



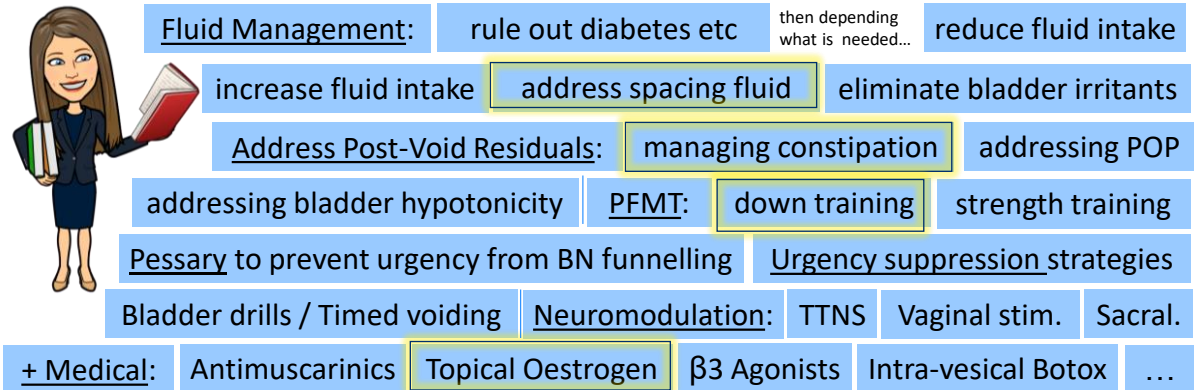
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110

in contrast....

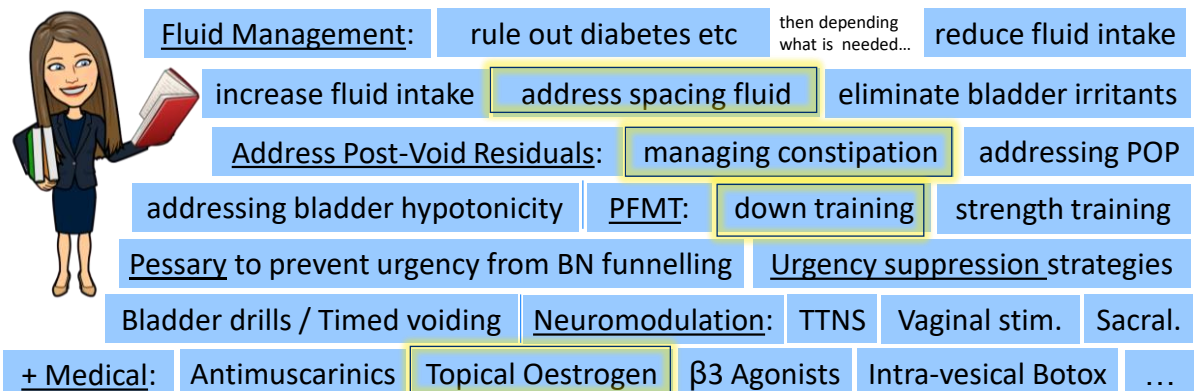
a different OAB patient will need....



111

The combinations are endless.

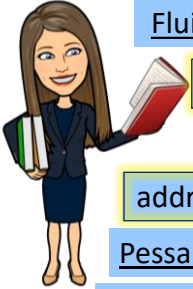
a different OAB patient will need....



112

What makes this even more problematic...

Some of these are directly opposite treatments



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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So what makes one person better might make another person worse!



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Which means that....

If our only approach is to...



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	increase fluid intake	address spacing fluid	eliminate bladder irritants
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Not only could we 'lose people' due to time taken to find the right Rx.....
 we might accidentally make some people worse before we get to the treatment that makes them better.



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Therefore

To achieve the highest cure rates, you need to be able to DETERMINE which treatments are RIGHT / WRONG for each SPECIFIC PATIENT



<u>Fluid Management:</u>	rule out diabetes etc	then depending what is needed...	reduce fluid intake
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But that requires us to have a very DEEP UNDERSTANDING of...



115

Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

*“Overactive bladder syndrome refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)**, in the absence of urinary tract infection (UTI) or other obvious pathology”^{4(p6)}*



If we look more closely at the definition above.....

The first things that we see is that....

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



116

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If we look more closely at the definition above.....

The term ‘Overactive Bladder Syndrome’, **is NOT actually a diagnosis.**

It is purely a term that describes **a certain group of symptoms** that commonly occur together!

The real **DIAGNOSIS** is whatever the **underlying cause is**, that is causing the **symptoms**

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



117

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Underlying Cause of these symptoms?

note: this is why OAB is so complex

Because there isn't just ONE CAUSE for each of these symptoms....

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



118

Overactive Bladder Syndrome

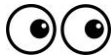


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Which result in **different symptoms combinations** ??



Let's just again more closely at the definition?

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



119

Criteria to allocate term “OAB Syndrome”



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- | | | |
|--|---|---|
| <p>SYMPTOM #1: <u>Urinary Urgency</u></p> | } | <p>the complaint of an abnormal ‘sudden, compelling desire to pass urine which is difficult to defer’^{4(p6)}</p> |
| <p>SYMPTOM #2: <u>Frequency</u></p> | } | <p>the complaint by a person that they void too often through the day or night^{4(p6)}</p> |
| <p>SYMPTOM #3: <u>Nocturia</u></p> | | |

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



120

Criteria to allocate term "OAB Syndrome"



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*"Overactive bladder syndrome refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)**, in the absence of urinary tract infection (UTI) or other obvious pathology"* ^{4(p6)}

- SYMPTOM #1:** Urinary Urgency } the complaint of an abnormal 'sudden, compelling desire to pass urine which is difficult to defer' ^{4(p6)}
- SYMPTOM #2:** Frequency } the complaint by a person that they void too often
- SYMPTOM #3:** Nocturia } through the day or night ^{4(p6)}

SYMPTOM #4:

HOWEVER..... IMPORTANT NOTE!!!
whilst the definition states these are 'usually' present, they are not compulsory for allocation of the term



4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20

121

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- SYMPTOM #2:** Frequency } the complaint by a person that they void too often
- SYMPTOM #3:** Nocturia } through the day or night ^{4(p6)}
- SYMPTOM #4:** urgency associated Urinary Incontinence } again.... 'with or without'..... therefore not compulsory
→ with = OAB wet → without = OAB dry



4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20

122

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- SYMPTOM #1:** Urinary Urgency **VERY important note!!!**
- SYMPTOM #2:** Frequency
SYMPTOM #3: Nocturia } the complaint by a person that they void too often through the day or night ^{4(p6)}
- SYMPTOM #4:** urgency associated Urinary Incontinence } again.... 'with or without'..... therefore not compulsory
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123

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- | | | |
|---------------------------|---|--|
| | SYMPTOM #1: <u>Urinary Urgency</u> | Urinary Urgency is the only compulsory symptom that must be present to allocate the term |
| May or may not be present | SYMPTOM #2: <u>Frequency</u>
SYMPTOM #3: <u>Nocturia</u> | } the complaint by a person that they void too often through the day or night ^{4(p6)} |
| | SYMPTOM #4: <u>urgency associated Urinary Incontinence</u> | } again.... 'with or without'..... therefore <u>not compulsory</u>
→ with = OAB wet → without = OAB dry |

4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



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Overactive Bladder Syndrome = Urgency

any person with
+/- a variable mix of
other symptoms



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“Overactive bladder syndrome refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)** (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology” 4(p6)

SYMPTOM #1: Urinary Urgency Urinary Urgency is the only **compulsory symptom** that must be present to allocate the term

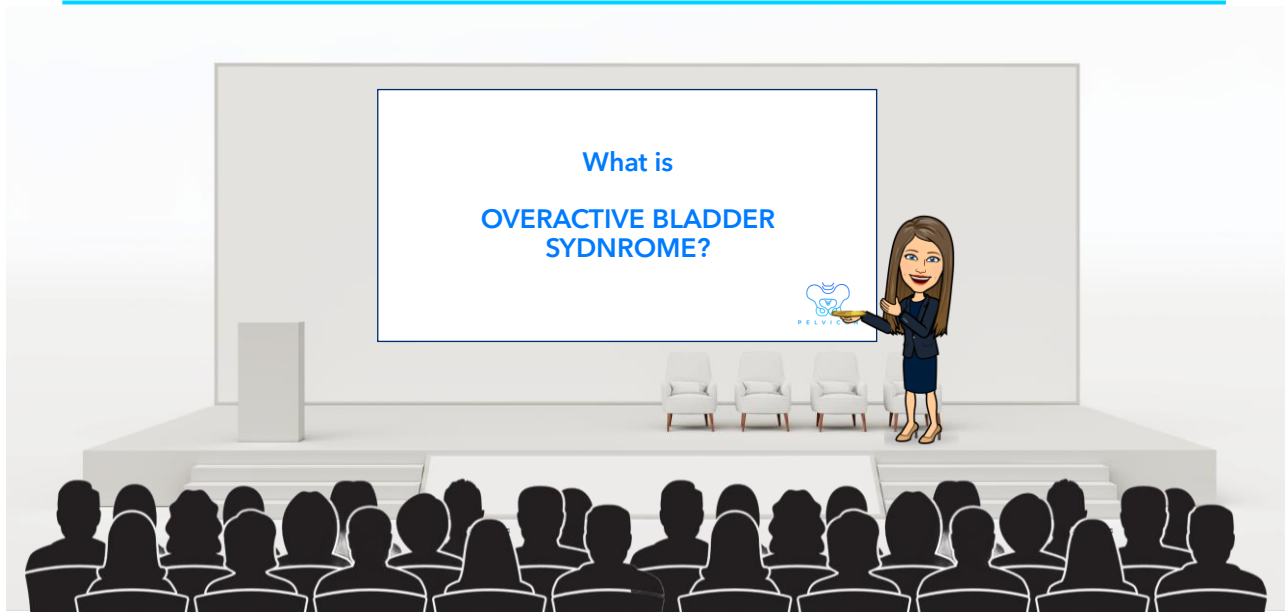
May or may not be present { **SYMPTOM #2: Frequency**
SYMPTOM #3: Nocturia } the complaint by a person that they void too often through the day or night 4(p6)
SYMPTOM #4: urgency associated Urinary Incontinence } again.... ‘with or without’..... therefore **not compulsory**
→ with = OAB wet → without = OAB dry



4 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20

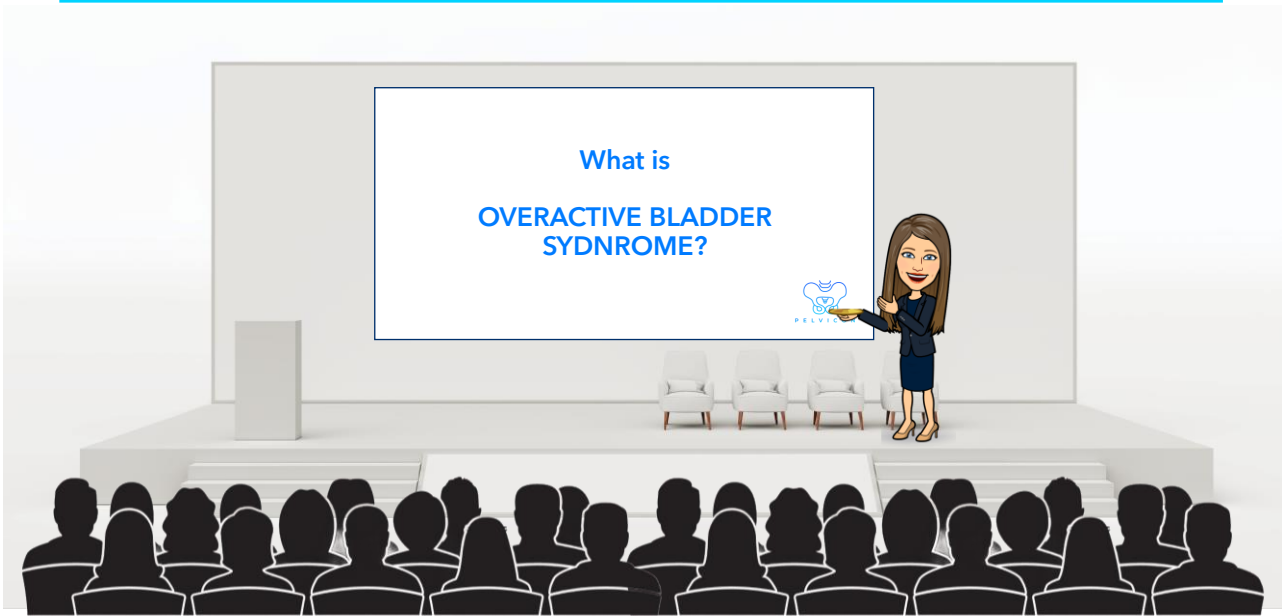
125

Why am I going on about this so much?



126

Because 'OAB' is NOT A DIAGNOSIS!!!!



127

Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

*“Overactive bladder **syndrome** refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)**, in the absence of urinary tract infection (UTI) or other obvious pathology”^{1(p6)}*

SYMPTOM SET THAT PATIENTS CAN PRESENT WITH



1 Haylen BT, De Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn.* 2010 Jan;29(1):4-20



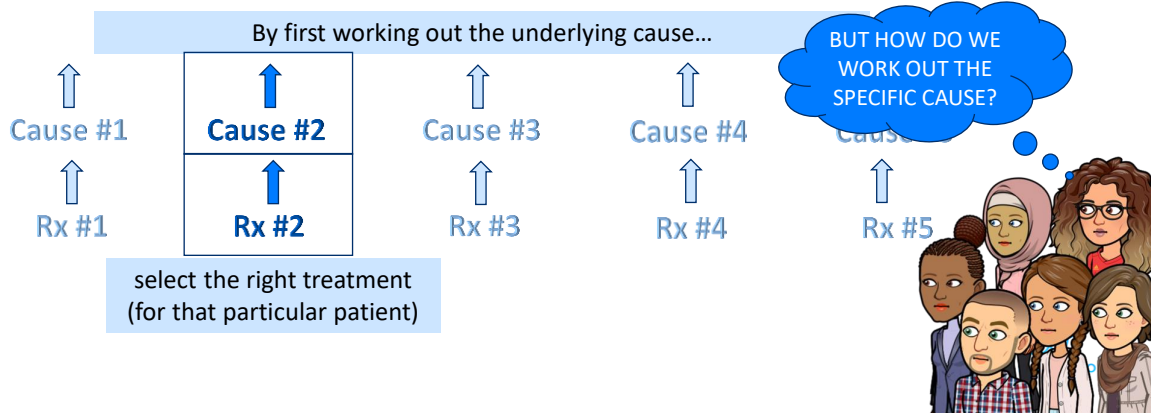
128

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DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

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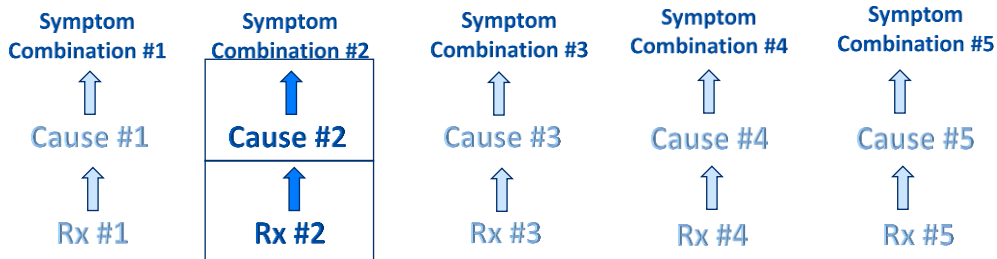
129

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130

Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

“Overactive bladder **syndrome** refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)**, in the absence of urinary tract infection (UTI) or other obvious pathology” ^{4(p6)}



If we start by simply focusing on which **combination of symptoms** they have, It will give us a hint towards what the cause could be:



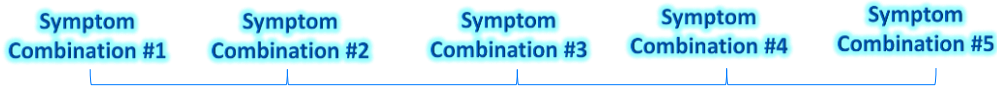
131

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“Overactive bladder **syndrome** refers to a person presenting with **urinary urgency**, usually accompanied by **frequency and nocturia**, with or without **urgency urinary incontinence (UUI)**, in the absence of urinary tract infection (UTI) or other obvious pathology” ^{4(p6)}



If we start by simply focusing on which **combination of symptoms** they have, It will give us a hint towards what the cause could be:



132

Varying OAB (and not OAB) Presentations

Four different patients present to your clinic.....



133

Varying OAB (and not OAB) Presentations

CASE ONE presents with

- Day Frequency = 9 / day
- Nocturia = 4 / night
- Urgency episodes = 2-3 / day
- UUI = none ✕

= **OAB Dry** The underlying pathophysiology must be something that causes...

CASE TWO presents with

- Day Frequency = 6 / day ✕
- Nocturia = 1 / night ✕
- Urgency episodes = 3-4 / day
- UUI = 1-2 / day

= **OAB Wet** The underlying pathophysiology in this person must be something that causes...



134

Varying OAB (and not OAB) Presentations

CASE ONE presents with

- **Day Frequency** = 9 / day
- **Nocturia** = 4 / night
- **Urgency episodes** = 2-3 / day
- UUI = none ✗

= **OAB Dry** The underlying pathophysiology must be something that causes...

CASE TWO presents with

- Day Frequency = 6 / day ✗
- Nocturia = 1 / night ✗
- **Urgency episodes** = 3-4 / day
- **UUI** = 1-2 / day

= **OAB Wet** The underlying pathophysiology in this person must be something that causes...

CASE THREE presents with

- Day Frequency = 9 / day
- Nocturia = 4 / night
- ~~Urgency episodes = 0 / day~~
- ~~UUI = 0 / day~~

= **NOT OAB syndrome at all!!**
simply have FREQUENCY and NOCTURIA

opposite →



IMPORTANT NOTE

The cause of this person's frequency and nocturia is unlikely to be anything to do with "Overactivity in the Bladder".

It will be a DIFFERENT CAUSE → Different Rx



135

Case #3 is not OAB... FREQUENCY & NOCTURIA

and therefore not strictly the focus of my talk today

But clinically you will see this type of presentation.

So you will need to be able to distinguish this from OAB.

What are some possible underlying causes of urinary frequency, in particular, those not related to urgency ?

CASE THREE presents with

- **Day Frequency** = 9 / day
- **Nocturia** = 4 / night
- ~~Urgency episodes = 0 / day~~
- ~~UUI = 0 / day~~

= **NOT OAB syndrome at all!!**
simply have FREQUENCY and NOCTURIA



IMPORTANT NOTE

The cause of this person's frequency and nocturia is unlikely to be anything to do with "Overactivity in the Bladder".

It will be a DIFFERENT CAUSE → Different Rx



136

Causes of Urinary Frequency (+/- nocturia)

URINARY FREQUENCY

Let's start with **4 broad causes** and then sub-divide each of those into **further specific causes**



137

Causes of Urinary Frequency (+/- nocturia)

1. Increased Urine
Production

2. Incomplete
Bladder Emptying

URINARY FREQUENCY

But even if you identify one of these....

3. Low Compliance Bladder

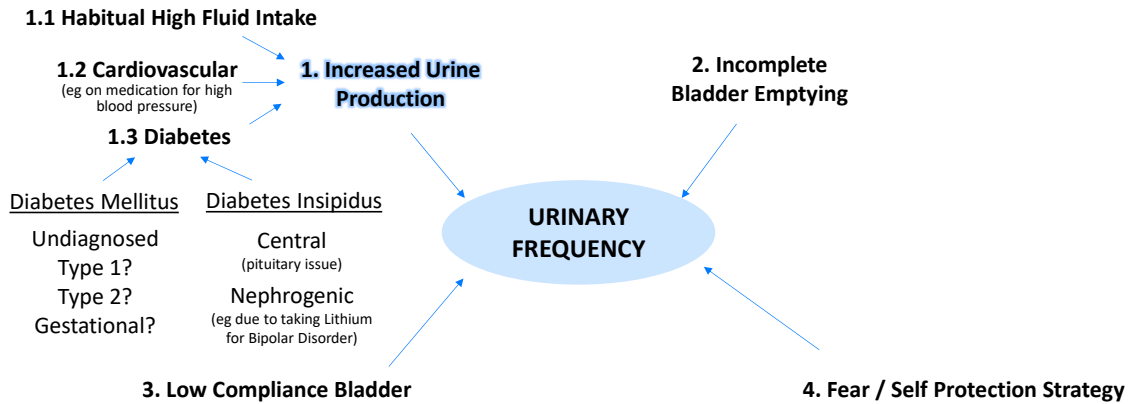
4. Fear / Self Protection Strategy

You need to know **WHY** they have
one of these so you can treat it



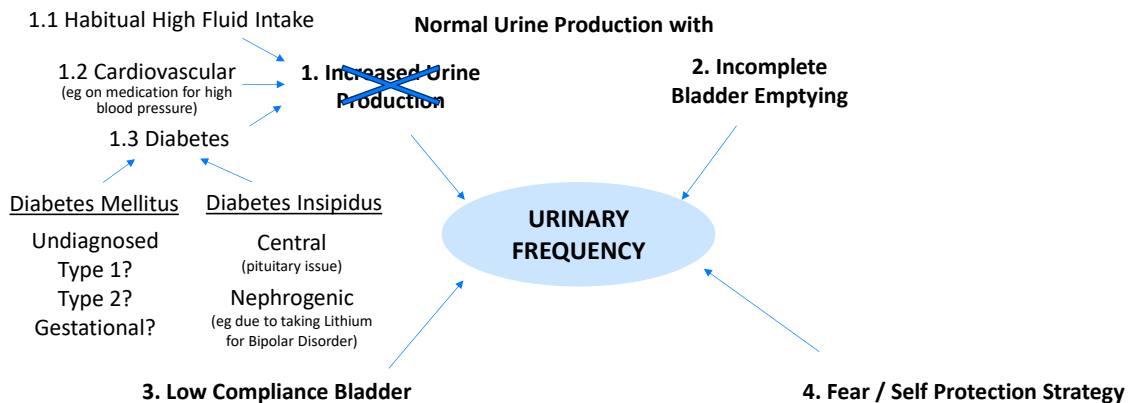
138

Causes of Urinary Frequency (+/- nocturia)



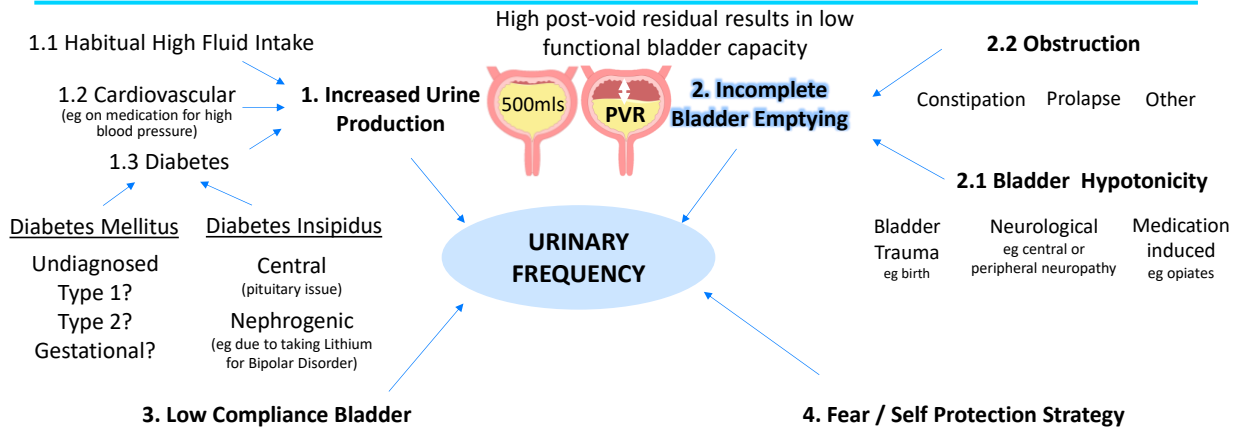
139

Causes of Urinary Frequency (+/- nocturia)



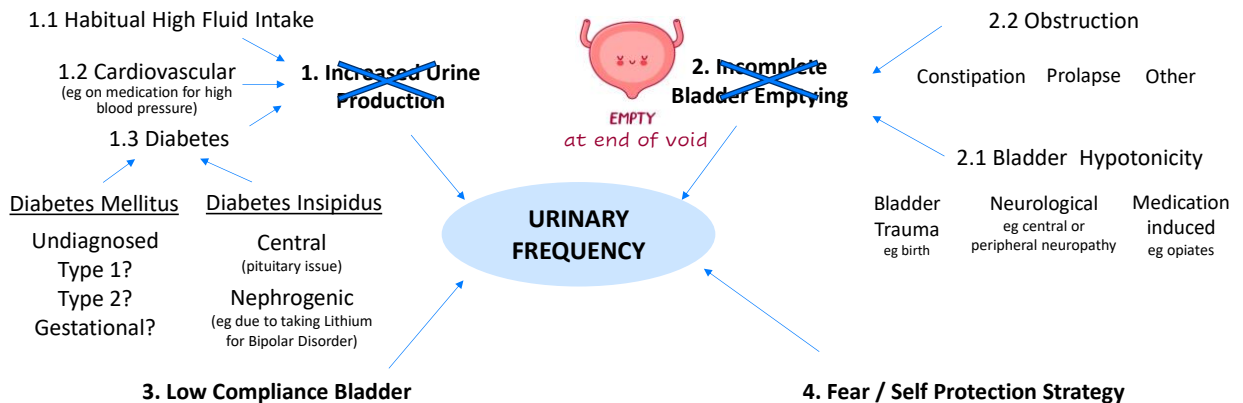
140

Causes of Urinary Frequency (+/- nocturia)



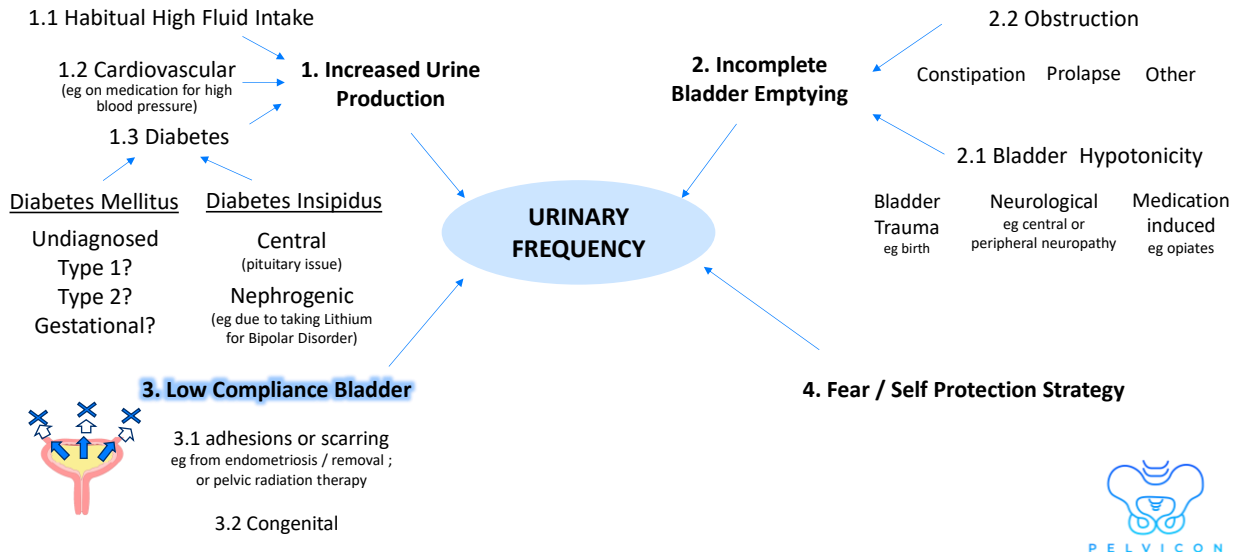
141

Causes of Urinary Frequency (+/- nocturia)



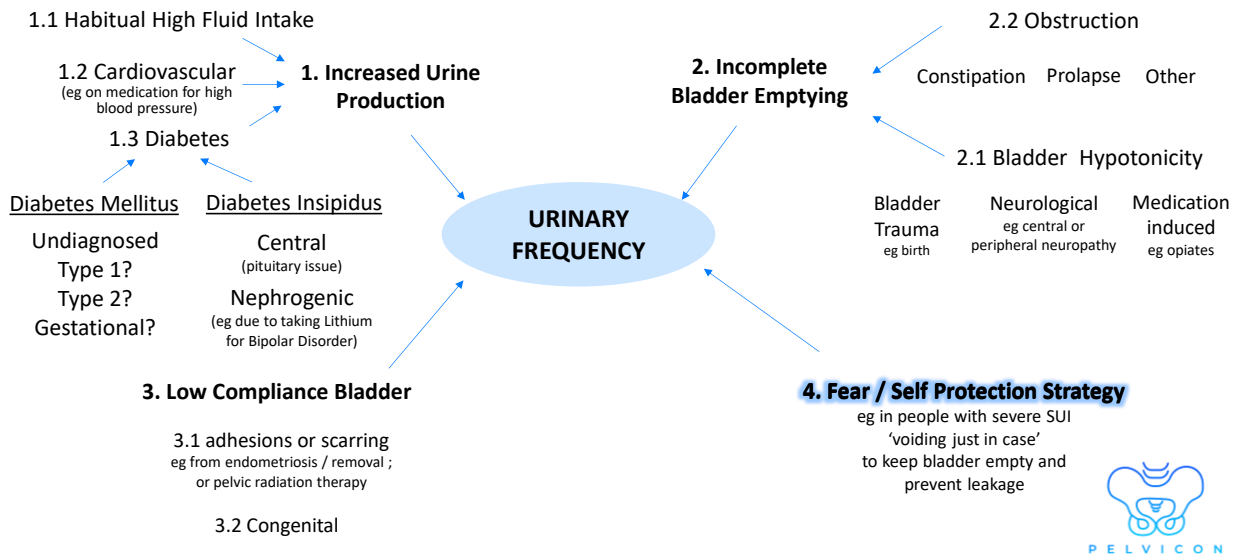
142

Causes of Urinary Frequency (+/- nocturia)



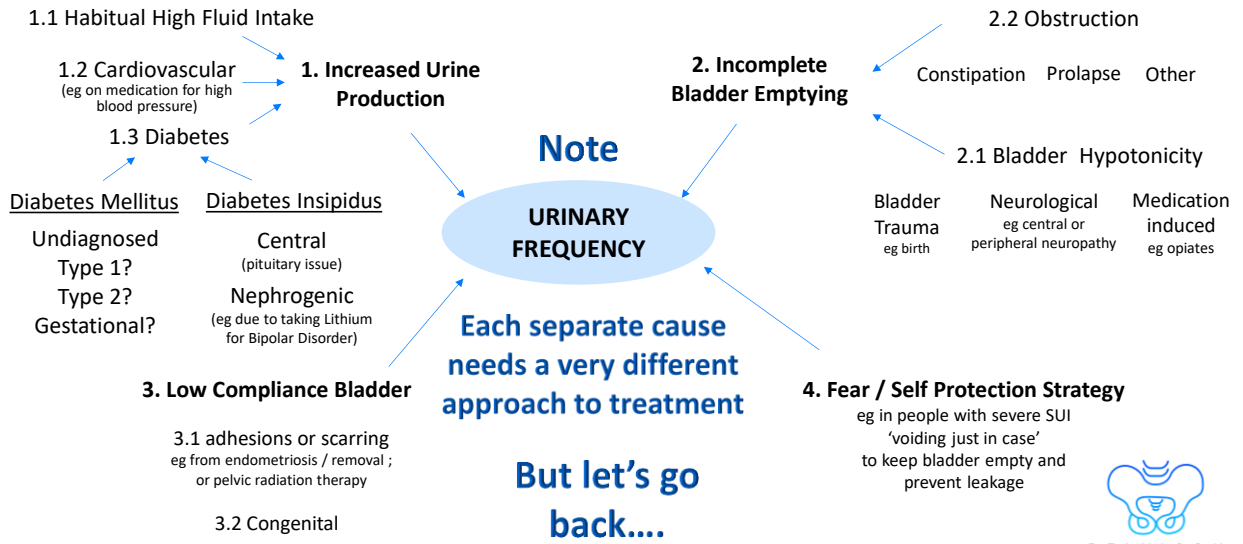
143

Causes of Urinary Frequency (+/- nocturia)



144

Causes of Urinary Frequency (+/- nocturia)



145

Varying OAB (and not OAB) Presentations

Before we diverted....

We had just looked at
THREE
 different presentations



146

Varying OAB (and not OAB) Presentations

CASE ONE

- Day Frequency = 9 / day
 - Nocturia = 4 / night
 - Urgency episodes = 2-3 / day
 - UUI = none
- = **OAB Dry** with frequency & nocturia

CASE TWO

- Day Frequency = 6 / day
 - Nocturia = 1 / night
 - Urgency episodes = 3-4 / day
 - UUI = 1-2 / day
- = **OAB Wet** (without frequency & nocturia)

CASE THREE

- Day Frequency = 9 / day
- Nocturia = 4 / night
- Urgency episodes = 0 / day
- UUI = 0 / day

= **FREQUENCY and NOCTURIA**
(not OAB at all)

Let's just do one more...



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Varying OAB (and not OAB) Presentations

CASE ONE

- Day Frequency = 9 / day
 - Nocturia = 4 / night
 - Urgency episodes = 2-3 / day
 - UUI = none
- = **OAB Dry** with frequency & nocturia

CASE TWO

- Day Frequency = 6 / day
 - Nocturia = 1 / night
 - Urgency episodes = 3-4 / day
 - UUI = 1-2 / day
- = **OAB Wet** (without frequency & nocturia)

But they're different

NOTE

both OAB Wet...

CASE THREE

- Day Frequency = 9 / day
- Nocturia = 4 / night
- Urgency episodes = 0 / day
- UUI = 0 / day

= **FREQUENCY and NOCTURIA**
(not OAB at all)

CASE FOUR

- Day Frequency = 10 / day
 - Nocturia = 2 / night
 - Urgency episodes = 5 / day
 - UUI = 2-3 / day
- = **OAB Wet** with frequency & nocturia



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!!! IMPORTANT NOTE !!!

CASE ONE

- **Day Frequency** = 9 / day
- **Nocturia** = 4 / night
- **Urgency episodes** = 2-3 / day
- **UUI** = none

➔ = **OAB Dry** (with frequency & nocturia)

CASE TWO

- **Day Frequency** = 6 / day
- **Nocturia** = 1 / night
- **Urgency episodes** = 3-4 / day
- **UUI** = 1-2 / day

➔ = **OAB Wet** (without frequency & nocturia)

**aLL qualify as
OAB SYNDROME**

**But probably not the
same underlying cause**

CASE FOUR

- **Day Frequency** = 10 / day
- **Nocturia** = 2 / night
- **Urgency episodes** = 5 / day
- **UUI** = 2-3 / day

➔ = **OAB Wet** (with frequency & nocturia)

PELVICON

149

So what do we know so far?

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Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

“Overactive bladder syndrome refers to a person presenting with urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology”^{4(p6)}

Purely defines a Symptom Syndrome, with variable possible causes.

But it is not actually a diagnosis....

I will say however....

My experience is that OAB is a term that I find people seem to often ASSUME a certain underlying diagnosis.



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Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

“Overactive bladder syndrome refers to a person presenting with urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology”^{4(p6)}

QUESTION

What condition do many clinicians often assume is the underlying cause in people presenting with symptoms of OAB Syndrome (ie urgency)?



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Overactive Bladder Syndrome



DEFINITION (Haylen et al 2010 - ICS/IUGA Terminology Report)

“Overactive bladder syndrome refers to a person presenting with urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology” 4(p6)

ASSUMPTION



= “Detrusor Overactivity”

“involuntary detrusor contractions observed on cystometry during bladder filling” 4(p13)



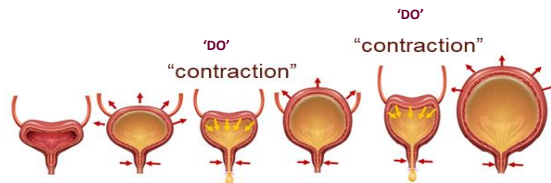
But is this true?



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SPOILER ALERT

If you have spent your career thinking that the term ‘overactive bladder’ is synonymous with ‘detrusor overactivity’, you may be about to get a shock



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OAB and Detrusor Overactivity

A QUESTION....



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OAB and Detrusor Overactivity

What percentage of women presenting with OAB Syndrome actually demonstrate detrusor overactivity on cystometry?

Giarenis et al 2013⁵

Performed cystometry on n = 556 women with OAB syndrome

Jimenez-Cidre et al 2019⁶

Performed cystometry on n = 247 women with OAB syndrome

Huang et al 2023⁷

Performed cystometry on n = 1,523 women with OAB syndrome



42.8%

evidence of DO

41.7%

evidence of DO

only 15.5%!

evidence of DO

**Less
than
half!**



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OAB and Detrusor Overactivity

CLINICAL APPLICATION POINT

Believing that everyone who has OAB symptoms has DO, is like thinking everyone who has a headache has it because of dehydration

(treating with this as the basis might work for some, but it won't work for others)



42.8%

evidence of DO

41.7%

evidence of DO

only 15.5%!

evidence of DO

Less than half!



157

OAB and Detrusor Overactivity

CLINICAL APPLICATION POINT

Believing that everyone who has OAB symptoms has DO, is like thinking everyone who has a headache has it because of dehydration

FIRST IMPORTANT LEARNING POINT

A lot of women who present to you with OAB symptoms don't even have DO

So there must be something else causing their symptoms
(which we will be getting to soon)

But!! there is something else you need to know about the frequency of the link between DO and Urgency...



42.8%

evidence of DO

41.7%

evidence of DO

only 15.5%!

evidence of DO

Less than half!



158

OAB and Detrusor Overactivity

These statistics simply say:

→some women with OAB will have evidence of detrusor overactivity when assessed by cystometry

→they don't actually comment on whether the DO observed was causing any symptoms



42.8%
evidence of DO

41.7%
evidence of DO

only 15.5%!
evidence of DO

Less than half!



159

OAB and Detrusor Overactivity

These statistics simply say:

→some women with OAB will have evidence of detrusor overactivity when assessed by cystometry

→they don't actually comment on whether the DO observed was causing any symptoms

QUESTION
**Even when DO is present....
is it causing the urgency symptoms?**

or could it be just an **incidental observation** we also see in normals?



42.8%
evidence of DO

41.7%
evidence of DO

only 15.5%!
evidence of DO

Less than half!



160

Detrusor Overactivity vs Symptoms



STUDY #1: Lowenstein et al 2009

Performed cystometry assessments on n = 33 people (incl both symptomatic & asymptomatic)
Traces were observed for evidence of detrusor overactivity, but also...

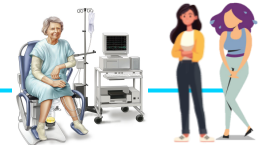
... participants were asked about any corresponding sensation of urgency

So what did they find??



161

Detrusor Overactivity vs Symptoms



STUDY #1: Lowenstein et al 2009⁸

Performed cystometry assessments on n = 33 people (incl both symptomatic & asymptomatic)
Traces were observed for evidence of detrusor overactivity, but also...

... participants were asked about any corresponding sensation of urgency

- in **10% of traces:** **there was an observable DO episode, that at the same time the person reported a sensation of urgency**
→ ie. the DO and urgency co-existed
- in **56% of traces:** the patient reported experiencing **urgency, but at a time where there was no observable detrusor overactivity**
→ ie. they had urgency NOT associated with DO
- in **29% of traces** there was an **episode of DO at a time where there was no symptomatic experience of urgency** by the patient
→ ie. they had DO without any symptoms!



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Detrusor Overactivity vs Symptoms



STUDY #1: Lowenstein et al 2009⁸

Performed cystometry assessments on n = 22 (11 symptomatic, 11 asymptomatic)
 Traces were observed for evidence of DO

... participants

29% of traces showed DO without any symptoms??

→ in **10% of traces:**

the time

That's more traces than the 10% of traces where DO occurred in conjunction with urgency

→ in **56% of traces:**

→ ie. they had urgency in conjunction with DO

→ in **29% of**

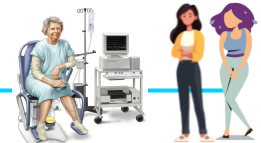
there was an **episode of DO at a time where there was no symptomatic experience of urgency** by the patient

→ ie. they had DO without any symptoms!



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Detrusor Overactivity vs Symptoms



STUDY #2: Digesu et al 2003⁹

Interviewed **n = 1641 people with demonstrated DO** on Urodynamics

→ asked about whether they suffer from any LUT symptoms (eg urgency, frequency etc)

→ only 27.8% (n = 457 / 1641) did report symptoms of OAB (urgency, freq etc) in everyday life

But that means...., **72.5% of people with DO did not report any OAB symptoms!**



164

Detrusor Overactivity vs Symptoms



STUDY #2: Digesu et al 2003⁹

Interviewed **n = 1641 people with demonstrated DO** on Urodynamics

→ asked about whether they suffer from any LUT symptoms (eg urgency, frequency etc)

→ only 27.8% (n = 457 / 1641) did report symptoms of OAB (urgency, freq etc) in everyday life

But that means...., **72.5% of people with DO did not report any OAB symptoms!**



This correlation b/w DO and Urgency
is starting to look pretty poor!

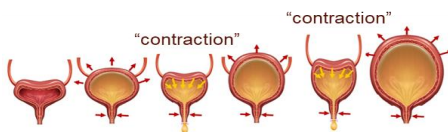


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LET'S THINK

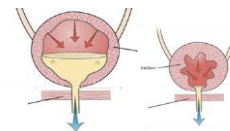
DETRUSOR OVERACTIVITY

= involuntary detrusor contractions
during filling



VOIDING

= voluntary detrusor contraction
during micturition



They both involve the detrusor contracting

But voiding doesn't cause a sensation of urgency

...so simply a contraction of detrusor smooth muscle cells isn't
enough on its own to cause urgency



166

Note: one thing we do know....

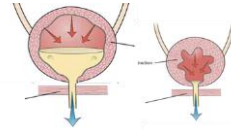
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...so simply a contraction of detrusor smooth muscle cells isn't
enough on its own to cause urgency



167

Note: one thing we do know....

DETRUSOR OVERACTIVITY

= involuntary detrusor contractions
during filling



People who experience

**detrusor overactivity at the same
time as their urgency episode**

are more likely
to also experienced UII

BUT

Whilst the DO may have contributed to the urine coming out,
the DO didn't CAUSE their initial sensation of urgency

The DO simply happened 'AT THE SAME TIME AS' their urgency episode



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FYI...ORIGINAL TERMINOLOGY REPORT

DETRUSOR OVERACTIVITY

= *involuntary detrusor contractions during filling*



ICS 2002 Terminology Report¹⁰

Detrusor overactivity refers to a
“urodynamic observation characterised by involuntary detrusor contractions during the filling phase which may be spontaneous or provoked.”

ICS 2002 footnote 25¹⁰

*It has been shown however that detrusor contractions **are not always accompanied by any sensation.** They are sometimes interpreted as a first sensation of bladder filling or as a normal desire to void.*



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Important Quote...

Drake & Abrams 2018¹¹

Received: 24 May 2018 | Accepted: 25 May 2018
 DOI: 10.1002/nau.23732

WILEY Journal of Urology Urodynamic ICS International Continence Society Urology

A commentary on expectations of healthcare professionals when applying the international continence society standards to basic assessment of lower urinary tract function

Marcus J. Drake^{1,2} | Paul Abrams²



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Important Quote...

Drake & Abrams 2018¹¹

'clinicians often confuse different terms within the field of LUT dysfunction involving the word 'overactive'....

First, the term **'overactive'** can be used in the context of the term **detrusor overactivity** (DO), which is a urodynamic observation of a bladder contraction during filling,

Secondly, it is used in the context of the term **overactive bladder (OAB) syndrome**, which is a symptom syndrome involving the sensation of urgency.

They then specifically state.....



171

Important Quote...

Drake & Abrams 2018¹¹

'clinicians often confuse different terms within the field of LUT dysfunction involving the word 'overactive'....

First, the term **'overactive'** can be used in the context of the term **detrusor overactivity** (DO), which is a urodynamic observation of a bladder contraction during filling,

Secondly, it is used in the context of the term **overactive bladder (OAB) syndrome**, which is a symptom syndrome involving the sensation of urgency.

"Detrusor Overactivity and Overactive Bladder are not interchangeable terms"



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a heterogenous group of conditions involving a sensory dysfunction (urgency)

OAB vs DO

a motor 'dysfunction'?
(that may / may not cause symptoms)



OVERACTIVE BLADDER (OAB)

A term for people who experience:
“symptomatic urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology” (p6)



DETRUSOR OVERACTIVITY

A urodynamic observation characterized by:
“involuntary detrusor contractions during the filling phase which may be spontaneous or provoked”



The two may **co-exist** in **some women** presenting with 'OAB Syndrome'

but even then, that does NOT mean the DO is causing their urgency



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OVERACTIVE BLADDER (OAB)

A term for people who experience:
“symptomatic urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence (UUI), in the absence of urinary tract infection (UTI) or other obvious pathology” (p6)

If detrusor overactivity doesn't cause urgency, then what does cause urgency?

And why are people who experience urgency said to have an '**overactive bladder**'?
(if there often isn't DO)

This is where it starts getting **REALLY IMPORTANT....**



174

FIRST IMPORTANT POINT

Urgency is basically an abnormal sensation

Which means it is a dysfunction of SENSORY SIGNALLING

If we were to oversimplify...



URGENCY!!!

If detrusor overactivity doesn't cause urgency, then what does cause urgency?

And why are people who experience urgency said to have an '**overactive bladder**'? (if there often isn't DO)



175

FIRST IMPORTANT POINT

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URGENCY!!!

If detrusor overactivity doesn't cause urgency, then what does cause urgency?

And why are people who experience urgency said to have an '**overactive bladder**'? (if there often isn't DO)

but....



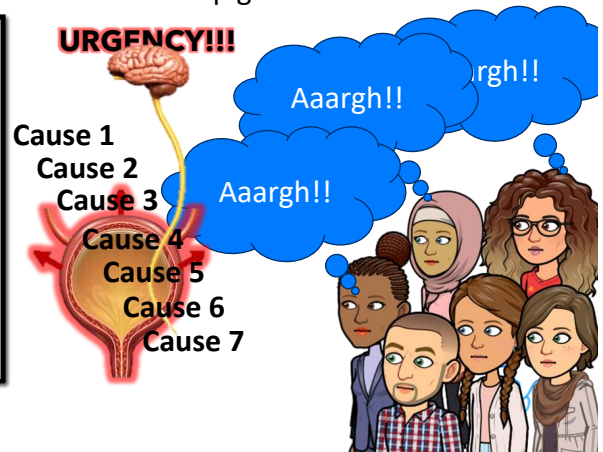
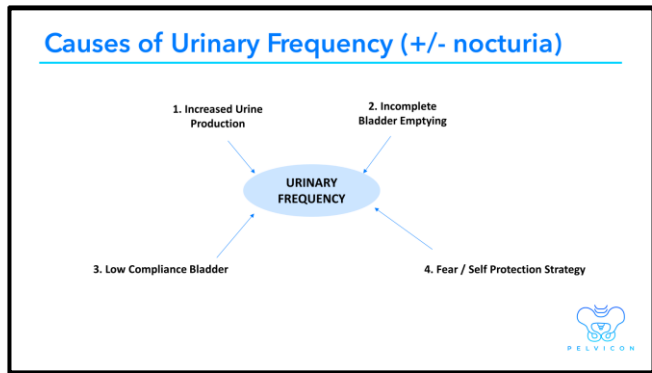
Urgency is a result of an 'overactivity' of one of the mechanisms that usually enables us to have a normal sensory experience

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SECOND IMPORTANT POINT

You know how there are lots of **causes** of frequency...
There are **just as many** varied causes for urgency....

But don't worry!!!
In the same way we could **sub-group frequency causes** to help simplify....
There is a way we can **sub-categorise urgency causes** too, to help get us started....



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SUB-CATEGORIES OF URGENCY

There are four main SUBTYPES OF URGENCY

NOT OAB			
<p>1. URGENCY linked to 'feeling like' <u>THE BLADDER IS REALLY FULL!!</u></p>	<p>2. URGENCY despite feeling that <u>THE BLADDER DOESN'T FEEL FULL</u></p>	<p>3. URGENCY that occurs suddenly <u>AT VERY LARGE BLADDER VOLUMES</u></p>	<p>4. URGENCY linked to a feeling <u>PAIN ON BLADDER FILLING</u></p>
<p>commonly related to overall increased bladder sensation</p>	<p>can occur in people w normal bladder sensation overall</p>	<p>commonly related to overall reduced bladder sensation</p>	<p>commonly related to BPS/IC; HLD; cancer, recurrent UTI etc</p>

references 12 - 14



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SUB-CATEGORIES OF URGENCY

Now we have **THREE** main **SUBTYPES OF URGENCY** separated by whether they are linked with

<p>1. URGENCY linked to 'feeling like' <u>THE BLADDER IS REALLY FULL!!</u></p>	<p>2. URGENCY despite feeling that <u>THE BLADDER DOESN'T FEEL FULL</u></p>	<p>3. URGENCY that occurs suddenly <u>AT VERY LARGE BLADDER VOLUMES</u></p>	<p>4. URGENCY linked to a feeling <u>PAIN ON BLADDER FILLING</u></p>
<p>commonly related to overall increased bladder sensation</p>	<p>can occur in people w normal bladder sensation overall</p>	<p>commonly related to overall reduced bladder sensation</p>	<p>commonly related to BPS/IC; HLD; cancer, recurrent UTI etc</p>

references 12 - 14



179

SUB-CATEGORIES OF URGENCY

Now we have **THREE** main **SUBTYPES OF URGENCY** separated by whether they are linked with

<p>1. URGENCY linked to 'feeling like' <u>THE BLADDER IS REALLY FULL!!</u></p>	<p>2. URGENCY despite feeling that <u>THE BLADDER DOESN'T FEEL FULL</u></p>	<p>3. URGENCY that occurs suddenly <u>AT VERY LARGE BLADDER VOLUMES</u></p>
<p>commonly related to overall increased bladder sensation</p> <p>↑</p>	<p>can occur in people w normal bladder sensation overall</p> <p>-</p>	<p>commonly related to overall reduced bladder sensation</p> <p>↓</p>

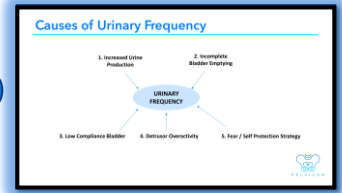
references 12 - 14



180

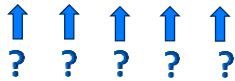
It is true that each of these can have a variety of different sub-causes... (like the detailed causes of urinary frequency)

BUT THE GOOD NEWS IS...



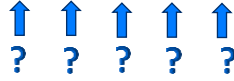
1. URGENCY
linked to 'feeling like'
THE BLADDER
IS REALLY FULL!!

commonly related to
overall increased bladder sensation



2. URGENCY
despite feeling that
THE BLADDER
DOESN'T FEEL FULL

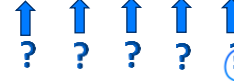
can occur in people w
normal bladder sensation



references 12 - 14

3. URGENCY
that occurs suddenly
AT VERY LARGE
BLADDER VOLUMES

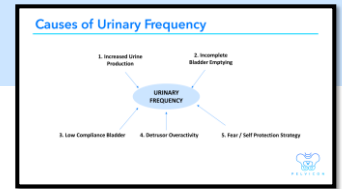
commonly related to
reduced bladder sensation



PELVICON

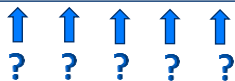
181

SUB-CATEGORIES OF URGENCY



1. URGENCY
linked to 'feeling like'
THE BLADDER
IS REALLY FULL!!

commonly related to
overall increased bladder sensation



2. URGENCY
despite feeling that
THE BLADDER
DOESN'T FEEL FULL

can occur in people w
normal bladder sensation



references 12 - 14

3. URGENCY
that occurs suddenly
AT VERY LARGE
BLADDER VOLUMES

commonly related to
reduced bladder sensation

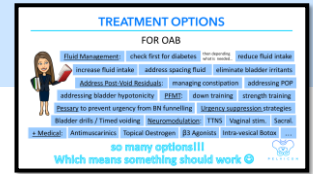


PELVICON

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SUB-CATEGORIES OF URGENCY

CAN BE USED TO BROADLY DIRECT TREATMENT



1. URGENCY
linked to 'feeling like'
THE BLADDER IS REALLY FULL!!

commonly related to **overall increased bladder sensation**

Check for PVR and address if needed
Address outlet obstruct. constipation
Reduce / Space Fluid Intake
Topical Oestrogen Therapy
??refer to check for uterine fibroids

2. URGENCY
despite feeling that
THE BLADDER DOESN'T FEEL FULL

can occur in people w **normal bladder sensation**

Urgency Supp; Bladder Drill ; TTNS
Cognitive Retraining for Cortical Triggers
PFMT or Pessary to address BN Funnelling
PF / Obt. Int. down-training if needed
Oestrogen +/- B3 agonist ; ?antimusc.

3. URGENCY
that occurs suddenly
AT VERY LARGE BLADDER VOLUMES

commonly related to **reduced bladder sensation**

(not as many options)
Put on Timed Voiding
Put on Timed Fluid Intake
??Queen's Square Stimulator

183

SUB-CATEGORIES OF URGENCY

NOTE: This slide can be your little cheat sheet 😊

if at a minimum...

1. URGENCY
linked to 'feeling like'
THE BLADDER IS REALLY FULL!!

commonly related to **overall increased bladder sensation**

Check for PVR and address if needed
Address outlet obstruct. constipation
Reduce / Space Fluid Intake
Topical Oestrogen Therapy
??refer to check for uterine fibroids

2. URGENCY
despite feeling that
THE BLADDER DOESN'T FEEL FULL

can occur in people w **normal bladder sensation**

Urgency Supp; Bladder Drill ; TTNS
Cognitive Retraining for Cortical Triggers
PFMT or Pessary to address BN Funnelling
PF / Obt. Int. down-training if needed
Oestrogen +/- B3 agonist ; ?antimusc.

3. URGENCY
that occurs suddenly
AT VERY LARGE BLADDER VOLUMES

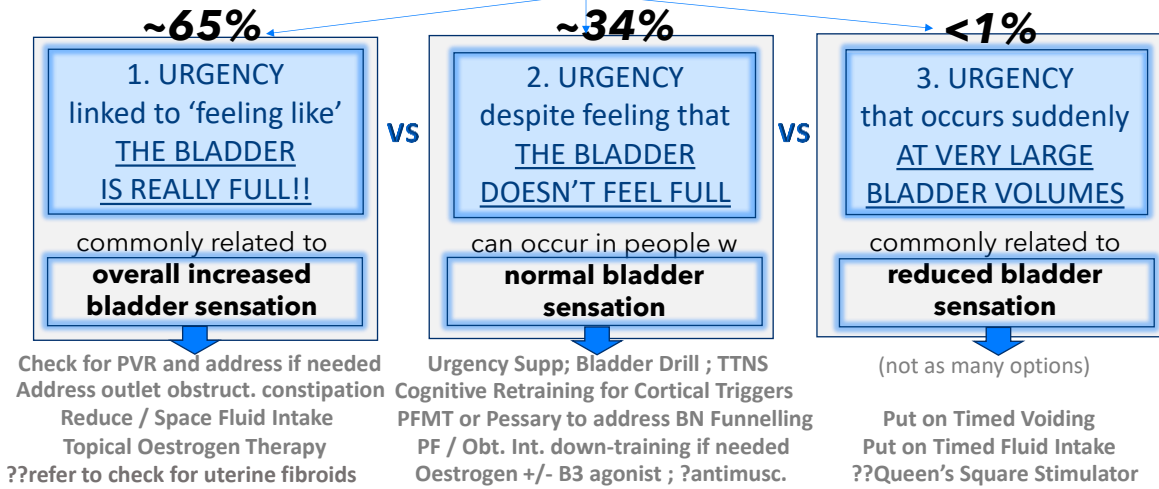
commonly related to **reduced bladder sensation**

(not as many options)
Put on Timed Voiding
Put on Timed Fluid Intake
??Queen's Square Stimulator

184

BUT !!!! I should also say...

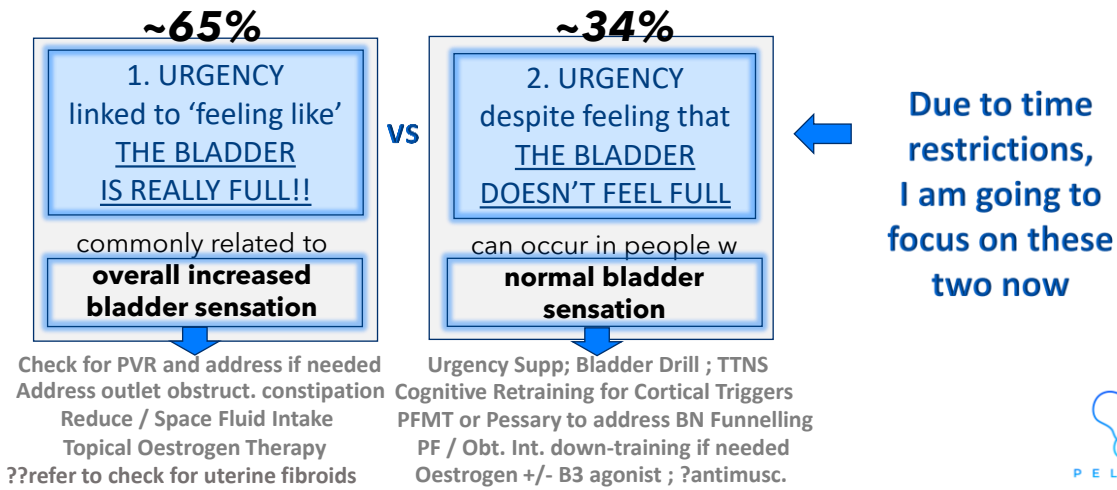
You can distinguish these 3 sub-types in their patients....



185

BUT !!!! I should also say...

You can distinguish these 3 sub-types in their patients....



186

SUB-CATEGORIES OF URGENCY

Just one other note: Terminology reports are not designed to diagnose....
There is no official terminology for urgency sub-types



Blaivas et al 2009 was the first to use the terms Type 1 and Type 2 urgency to understand there are different types of urgency in different people¹⁴

We all know clinically that there are different types of urgency that relate to different pathophysiology¹²⁻¹⁴

... *But it's not listed in the 'terminology reports'*

I am therefore simply using Blaivas' terminology so we have a language to differentiate different patients¹⁴.



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NOTE #2

*The vast majority of research done on this topic around the world is in **mls***

I am also used to teaching in mls

I have tried to convert many of the slides to also have oz

HOWEVER FYI.... the conversion:

30mls = ~1oz

Therefore.... 300mls = ~10oz

188

Urgency related to Normal vs ↑ed Bladder Sensation

Yamaguchi et al 2007¹⁵ described normal LUT sensation as generally involving:

*'a **pattern of sensations / desires to void** that gradually increase in intensity with increasing bladder volume, resulting in normal, controlled, voluntary voiding'*



189

Urgency related to Normal vs ↑ed Bladder Sensation

Yamaguchi et al 2007¹⁵ described normal LUT sensation as generally involving:

*'a **pattern of sensations / desires to void** that gradually increase in intensity with increasing bladder volume, resulting in normal, controlled, voluntary voiding'*



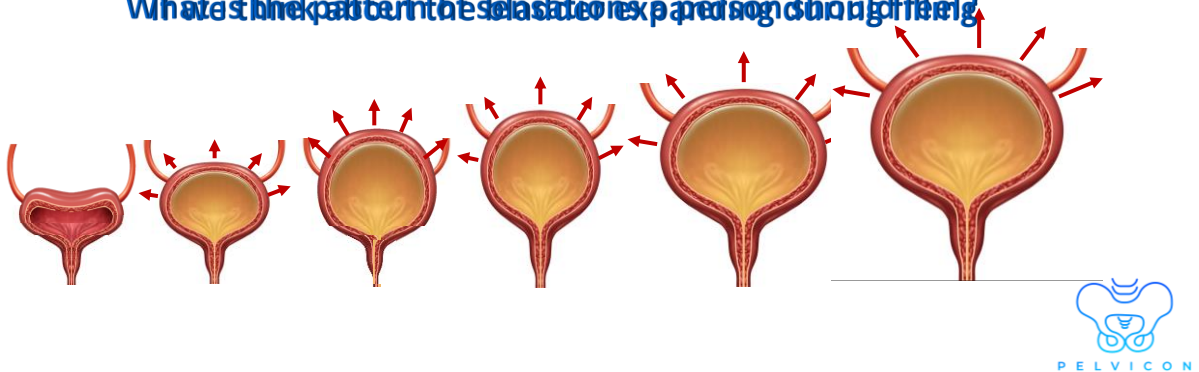
190

Urgency related to Normal vs ↑ed Bladder Sensation

Yamaguchi et al 2007¹⁵ described normal LUT sensation as generally involving:

'a pattern of sensations / desires to void that gradually increase in intensity **with increasing bladder volume**, resulting in normal, controlled, voluntary voiding'

What is the pattern of the sensation expanding during filling?

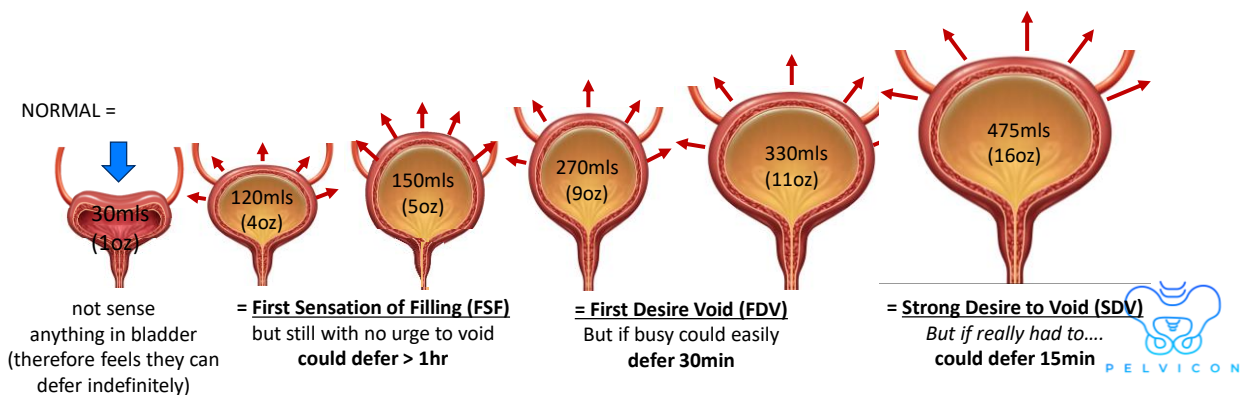


191

Urgency related to Normal vs ↑ed Bladder Sensation

Yamaguchi et al 2007¹⁵ described normal LUT sensation as generally involving:

'a pattern of sensations / desires to void that gradually increase in intensity **with increasing bladder volume**, resulting in normal, controlled, voluntary voiding'



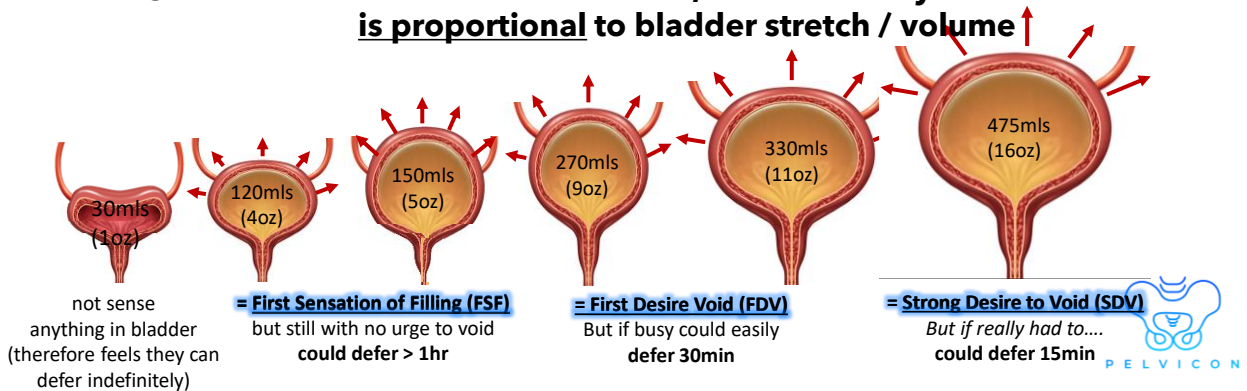
192

Urgency related to Normal vs ↑ed Bladder Sensation

Yamaguchi et al 2007¹⁵ described normal LUT sensation as generally involving:

*'a **pattern of sensations / desires to void** that gradually increase in intensity with increasing bladder volume, resulting in normal, controlled, voluntary voiding'*

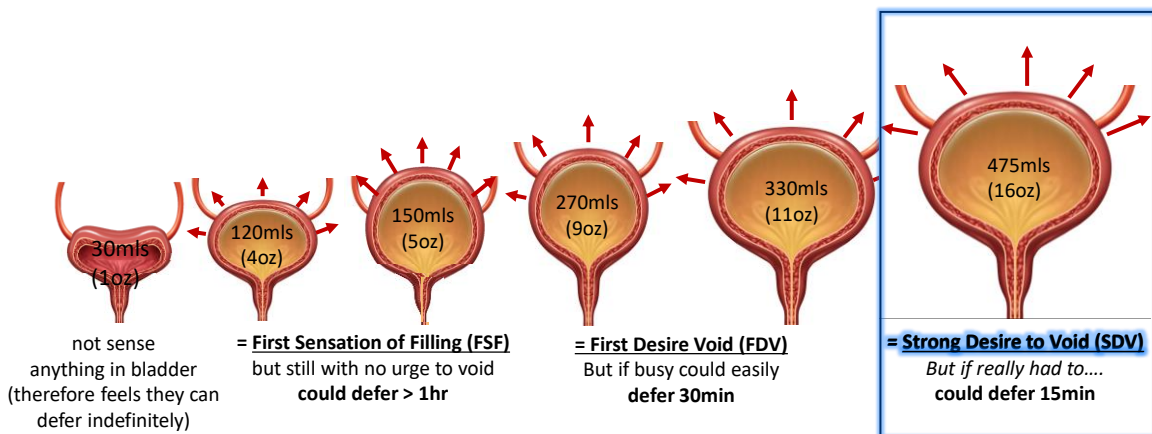
NORMAL: the level of sensation felt, and the ability to defer is proportional to bladder stretch / volume ↑



193

Urgency related to Normal vs ↑ed Bladder Sensation

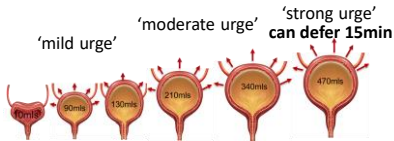
Just a little note about this



194

Clarification Point

STRONG URGE TO VOID



is a **normal** bladder sensation
a person is expected to experience when
their bladder becomes very full.

Occurs after a period of 'delaying voiding'

Whilst a strong urge can be a very distracting
feeling, the person reports they
can still defer 15min if they had to

not the same

URGENCY



is an **abnormal** bladder sensation
not necessarily related to the degree of bladder
fullness (can occur at small, medium or large volumes)

May come on very suddenly, without warning.

Even though the person's bladder may be at a
smaller volume than expected, they feel they
cannot wait even 5min for fear of leakage

195

But how does the LUT even create different sensations?

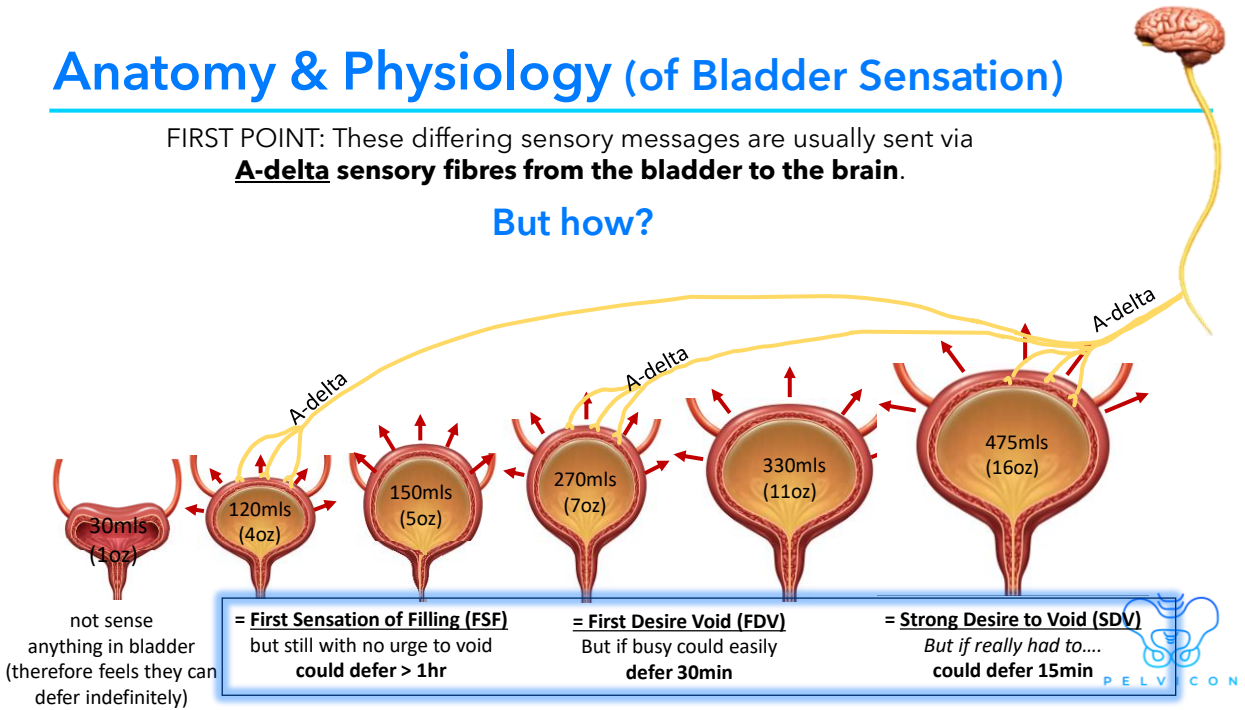


196

Anatomy & Physiology (of Bladder Sensation)

FIRST POINT: These differing sensory messages are usually sent via **A-delta sensory fibres from the bladder to the brain.**

But how?



197

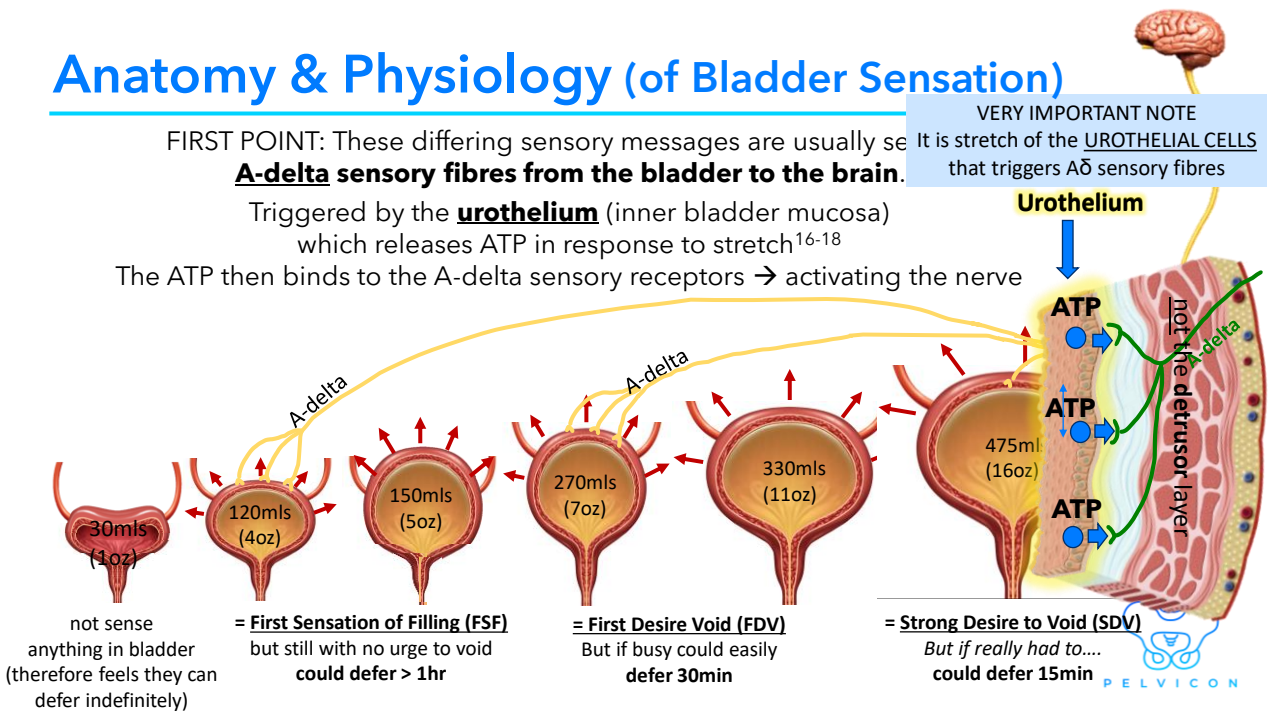
Anatomy & Physiology (of Bladder Sensation)

FIRST POINT: These differing sensory messages are usually sent via **A-delta sensory fibres from the bladder to the brain.**

VERY IMPORTANT NOTE
It is stretch of the **UROTHELIAL CELLS** that triggers Aδ sensory fibres

Triggered by the **urothelium** (inner bladder mucosa) which releases ATP in response to stretch¹⁶⁻¹⁸

The ATP then binds to the A-delta sensory receptors → activating the nerve



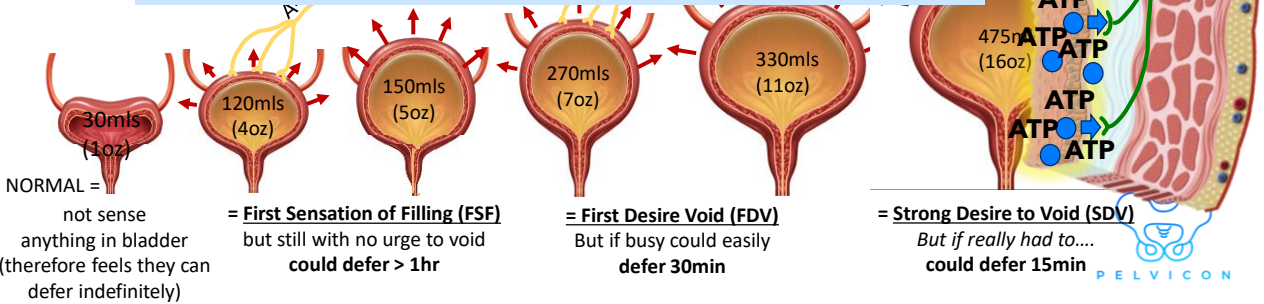
198

Ana

tion)

ANOTHER NOTE! am going to be explaining more about the urothelium soon....

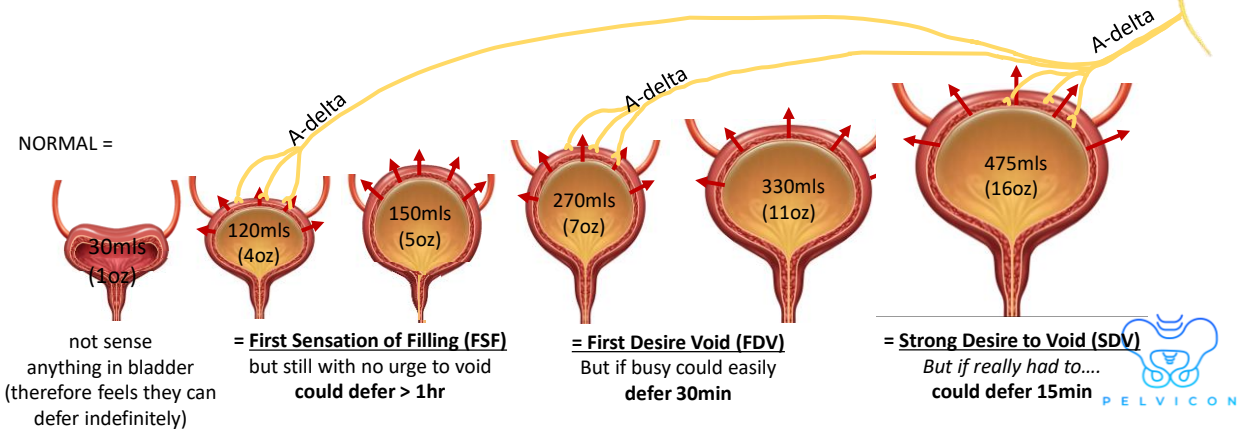
But a little spoiler alert.....
 one of the main reasons people with urgency are said to have an 'overactive bladder'
is often because the
UROTHELIUM is 'DISPROPORTIONATELY ACTIVATING' ¹⁹⁻²⁰
 → overproduction of ATP → ↑↑ Aδ firing → URGENCY!



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Anatomy & Physiology (of Bladder Sensation)

You can probably see this is going to get complex....



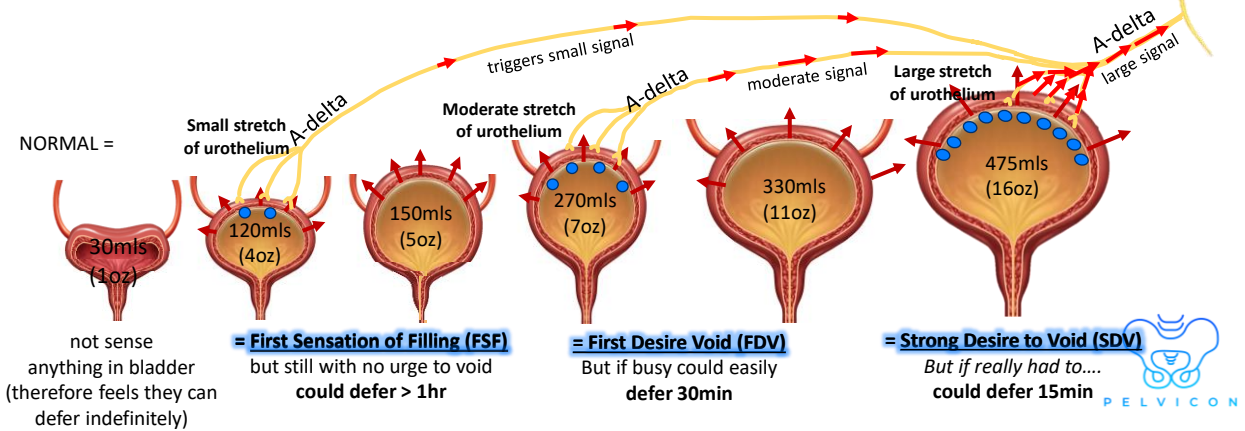
200

Anatomy & Physiology (of Bladder Sensation)

NOTHING is urgent!



just for the minute....
 Let's keep focus on understanding normal,
 so we can then better understand abnormal!



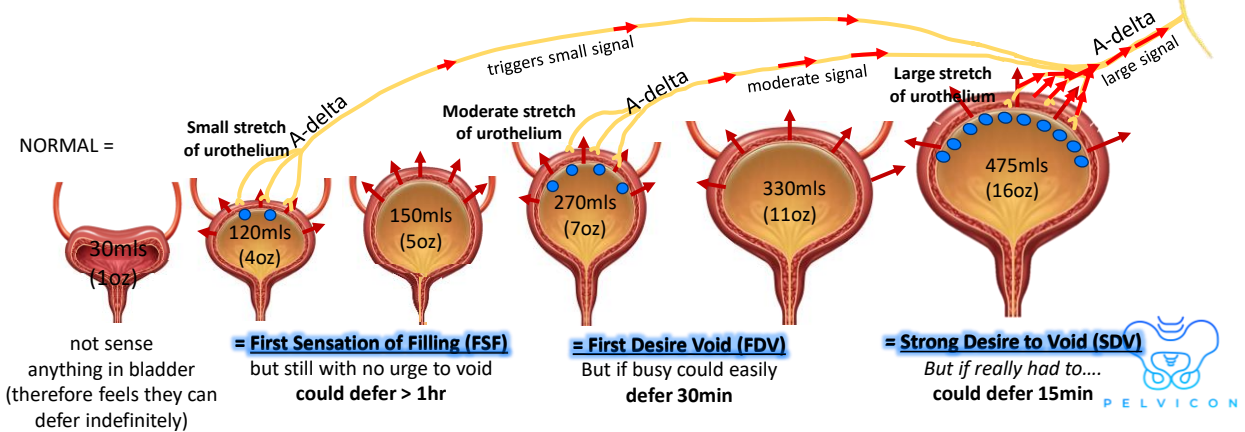
201

Anatomy & Physiology (of Bladder Sensation)

STRONG urge!

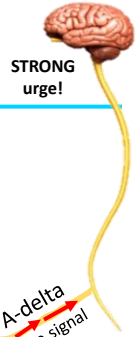


THEREFORE....
 = the bladder urothelium is releasing the expected amount of ATP
 for the volume of urine in the bladder!¹⁶⁻¹⁹

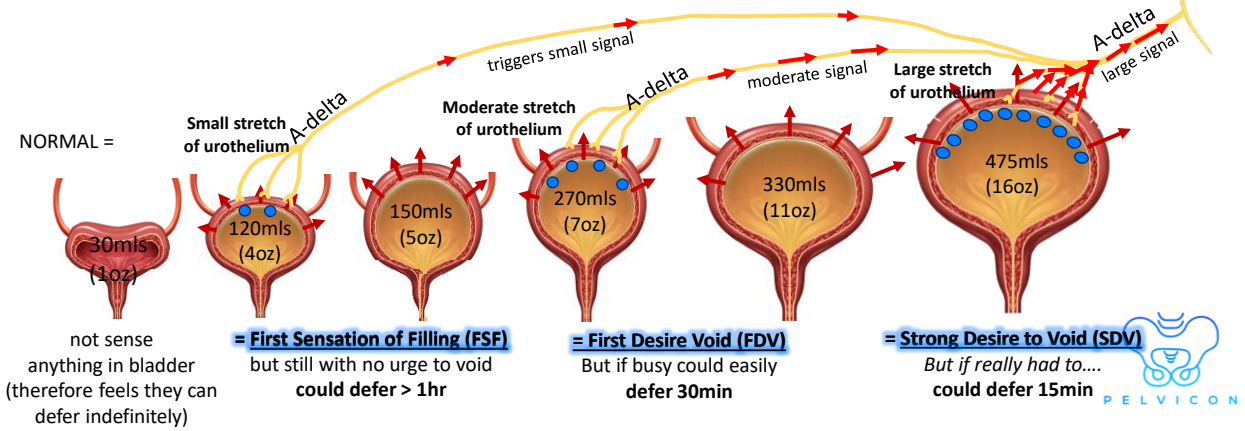


202

Anatomy & Physiology (of Bladder Sensation)



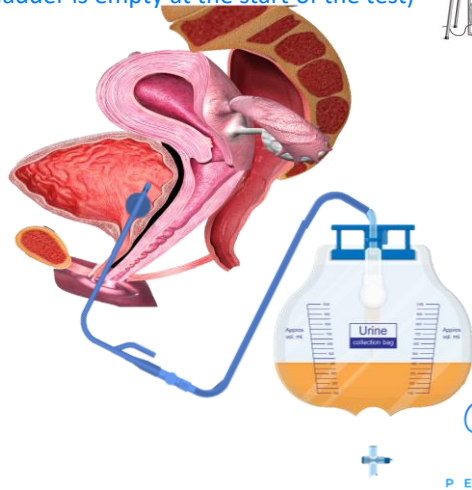
SIDE NOTE these terms are the **FORMAL ASSESSMENT MARKERS**
Bladder Sensation assessed during Cystometry



203

Cystometry (briefly)

Step 1 (PRE-TEST): Patient voids on a uroflow (to measure the vol), and then catheter is inserted to drain any PVR (to ensure bladder is empty at the start of the test)



References (4,21,22)

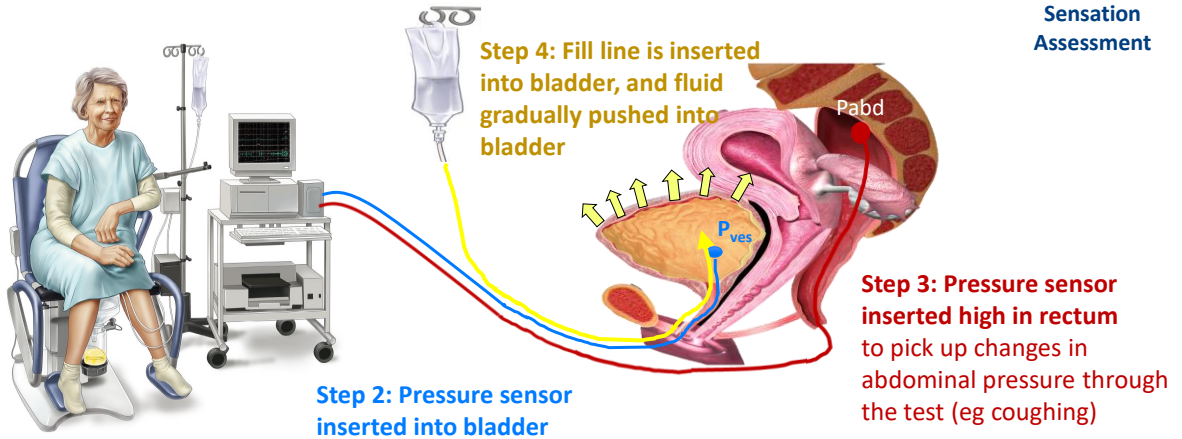
204

Cystometry (briefly)

ASSESSMENT: as the bladder is filled

1. Pves (the IVP) is monitored for any pressure changes
2. The patient is asked when they experience FSF, FDV, SDV

Sensation Assessment



Note: This is not to assess sensation
The **Pressure transducer (Pves)** is inserted to be able to assess for both **bladder compliance** and **detrusor overactivity** during filling

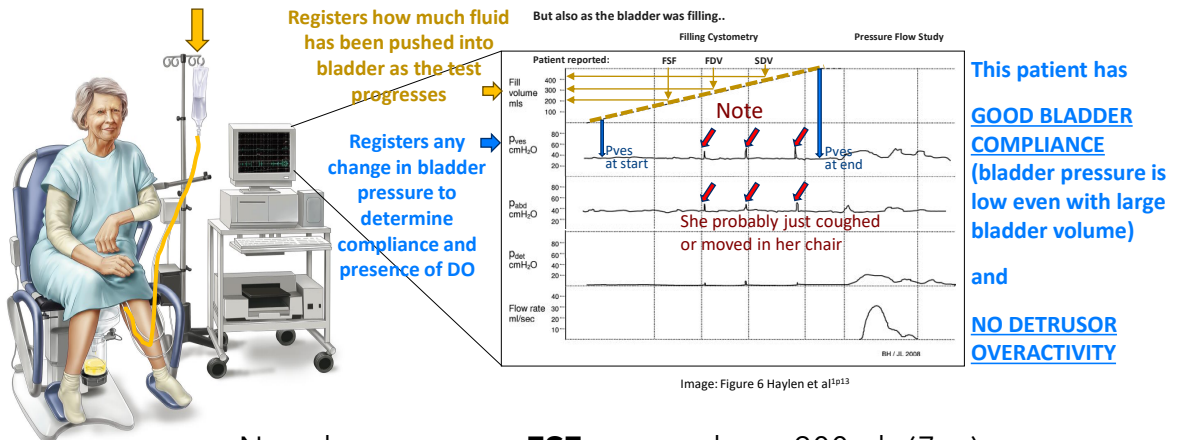
References (4,21,22)



205

Cystometry

Is this normal sensation?



Noted on report: **FSF** occurred at ~200mls (7oz)
FDV occurred at ~300mls (10oz)
SDV occurred at ~410mls (14oz)

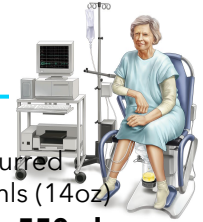
References (4,21,22)



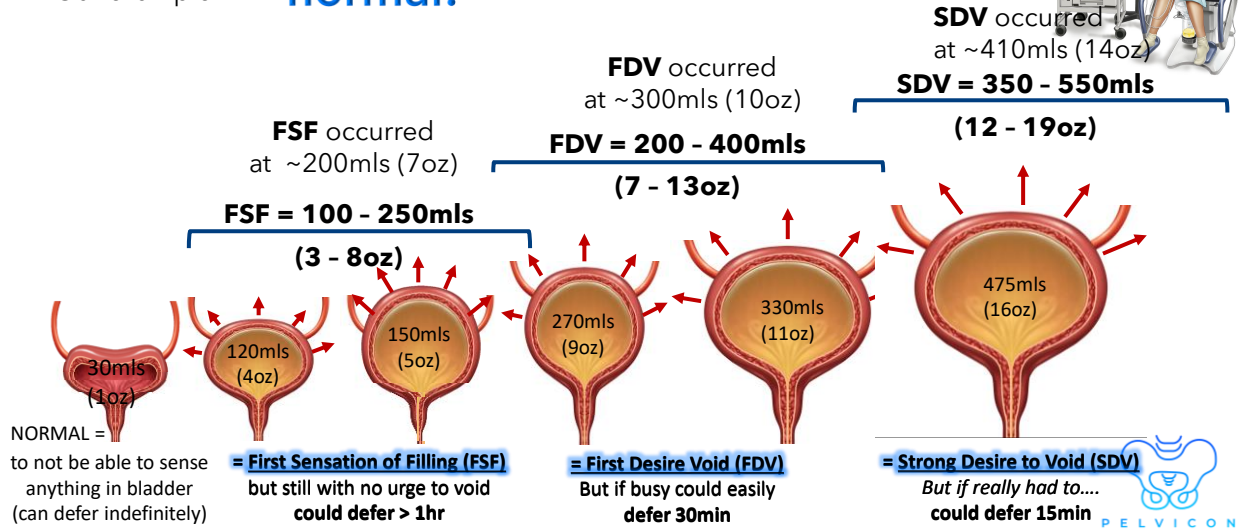
206

Normal Ranges on Cystometry

references 23-25



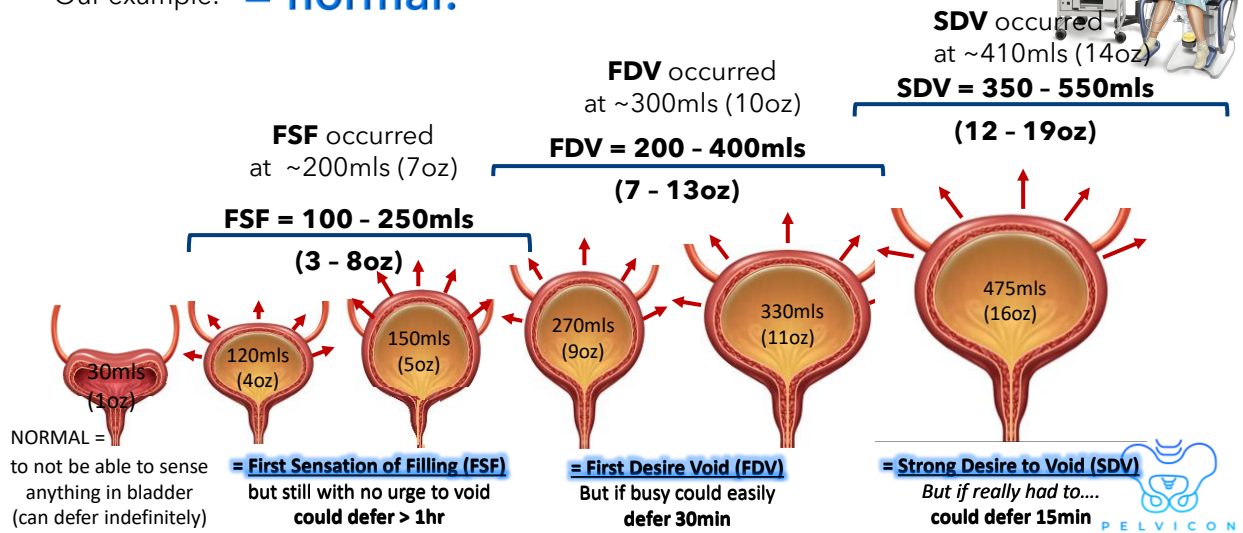
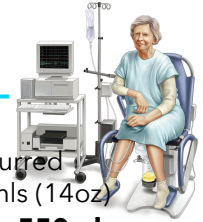
Our example: = normal!



207

So what happens with increased sensation?

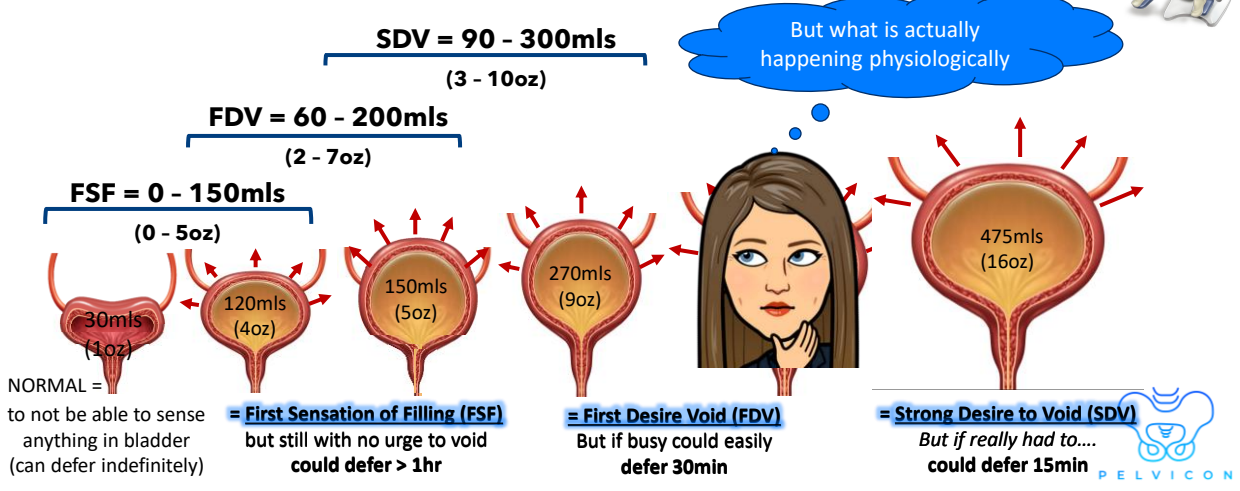
Our example: = normal!



208

So what happens with increased sensation?

People experience all the sensations at **smaller volumes**:

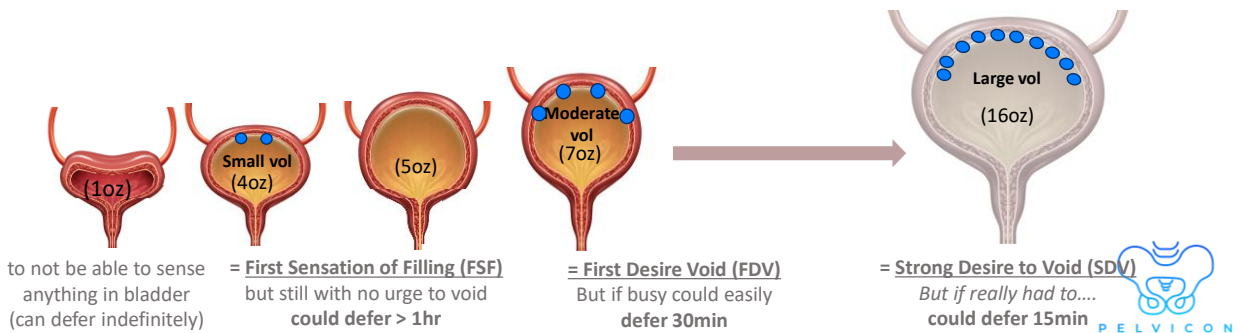


209

Increased Bladder Sensation

UNLIKE NORMAL =

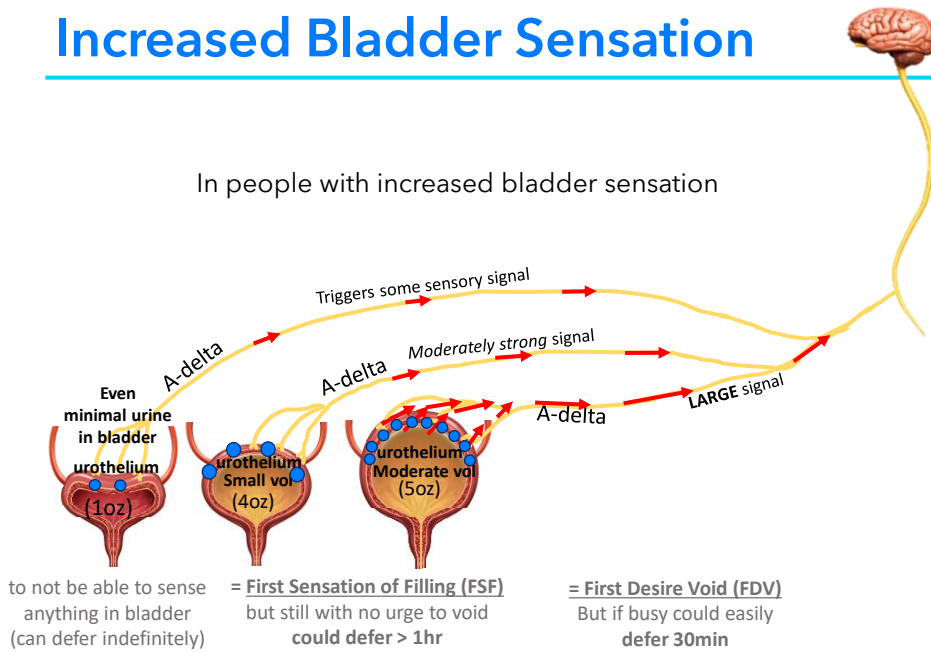
ATP is only released by the urothelium at the 'expected level'
(compared to volume of urine volume in bladder)



210

Increased Bladder Sensation

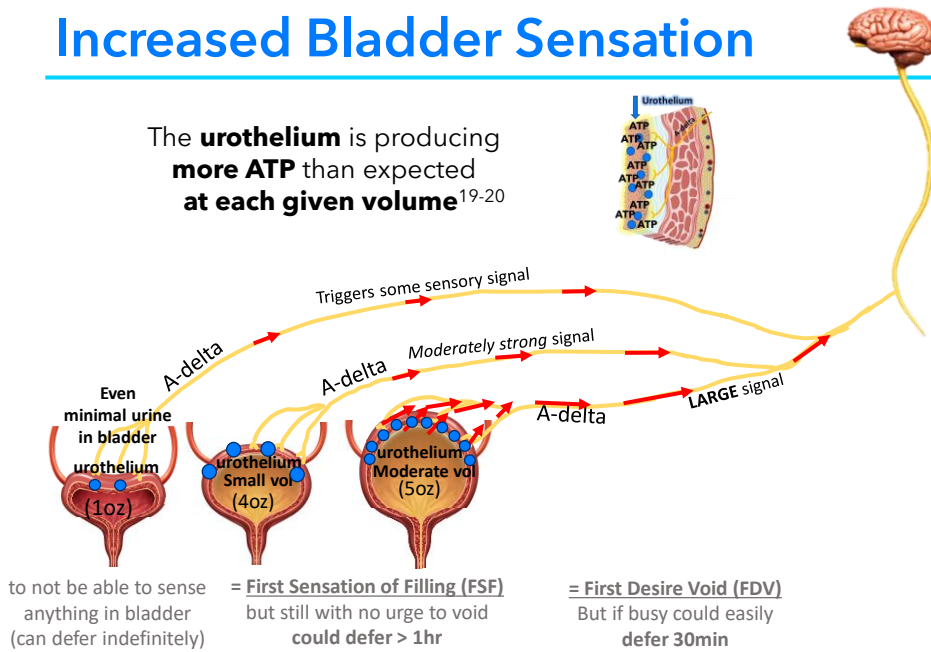
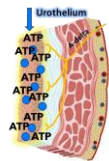
In people with increased bladder sensation



211

Increased Bladder Sensation

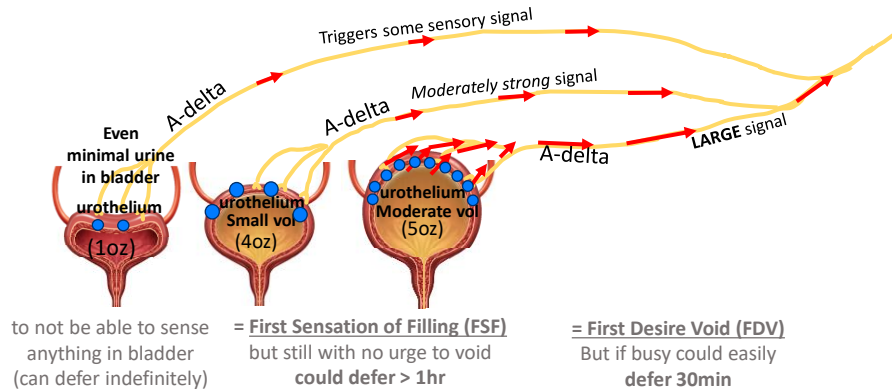
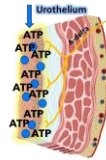
The **urothelium** is producing **more ATP** than expected at each given volume¹⁹⁻²⁰



212

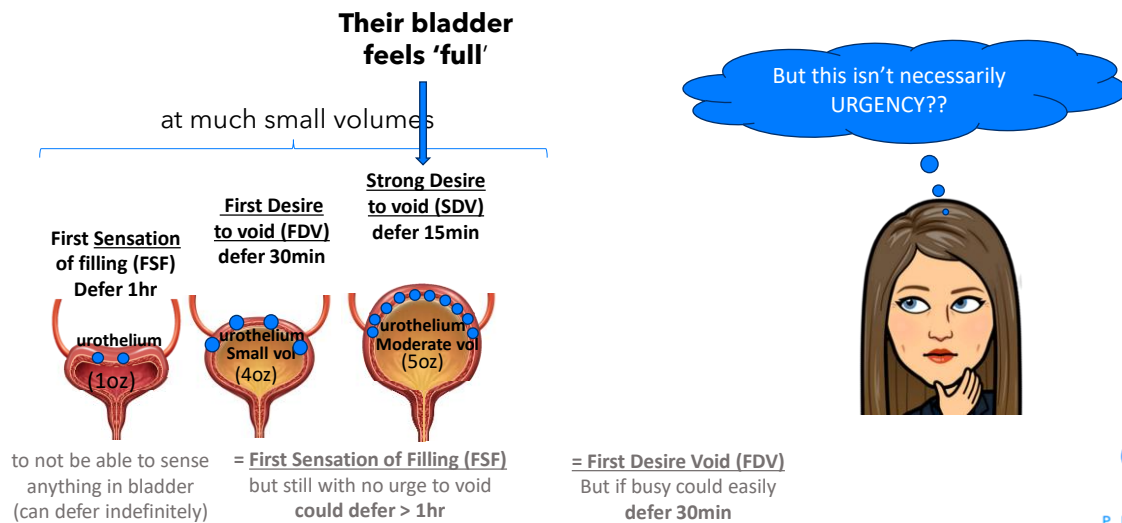
Which is why the person experiences....

The **urothelium** is producing **more ATP** than expected **at each given volume**¹⁹⁻²⁰



213

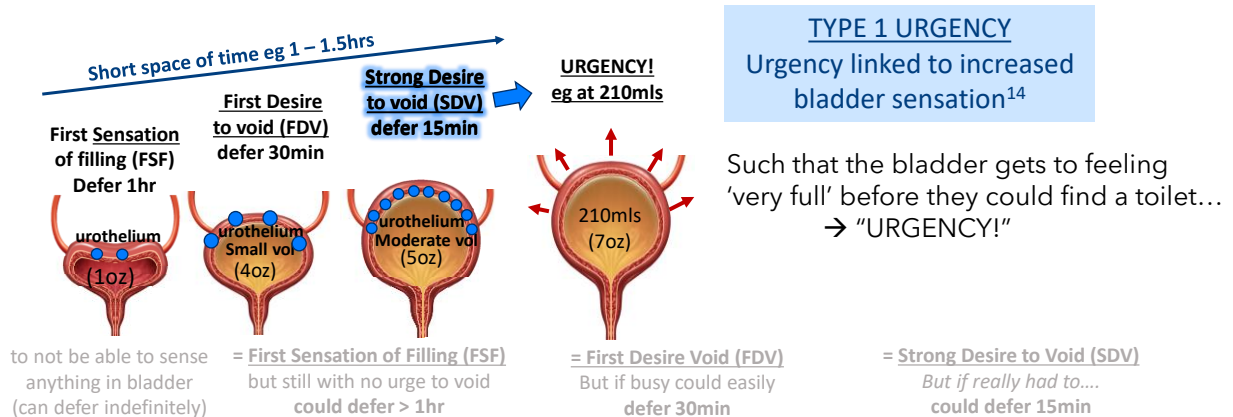
Which is why the person experiences....



214

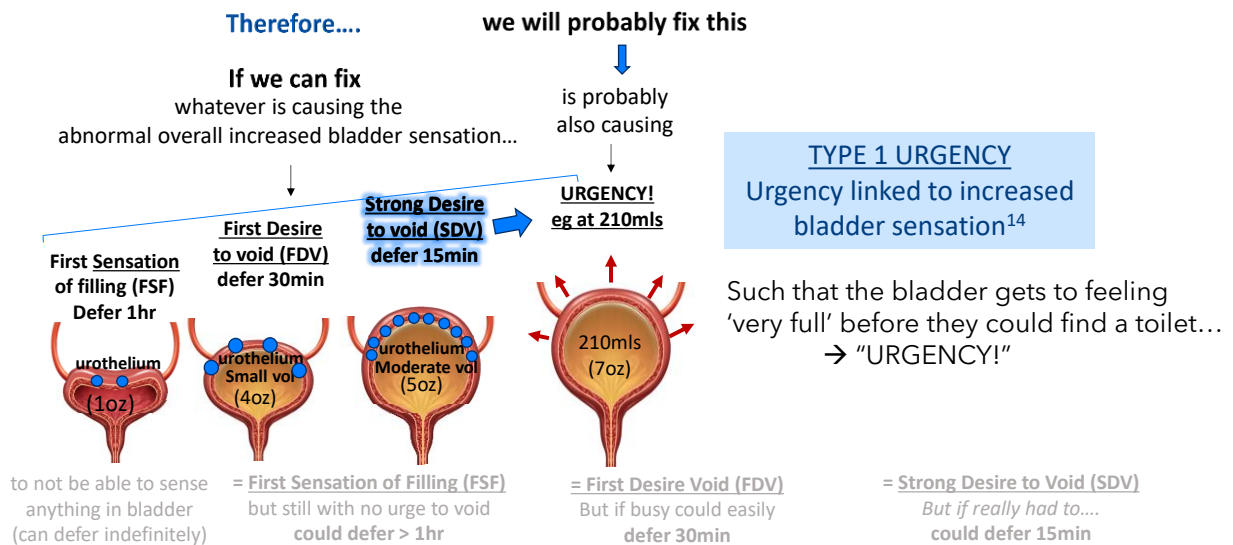
Which is why the person experiences....

But one of the problems with increased bladder sensation, is that in a short space of time...



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note re: Type 1 Urgency

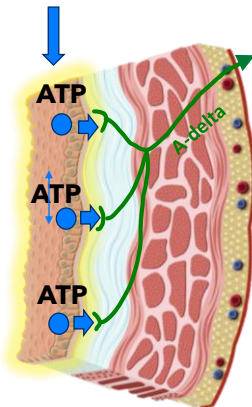


216

Causes of Increased Bladder Sensation

BACKGROUND POINTS TO REMEMBER ¹⁶⁻¹⁸

Urothelium



1. The A-delta sensory afferents are activated (giving sensation)....

because the urothelial cells of the bladder mucosa experience stretch on bladder filling

→ production and release of ATP by urothelium

→ ATP binds to the A-delta sensory receptors

→ activates the nerve.

Increased Bladder Sensation occurs when this mechanism is over-activating



to understand this though...
we need to understand how the urothelial cells do this

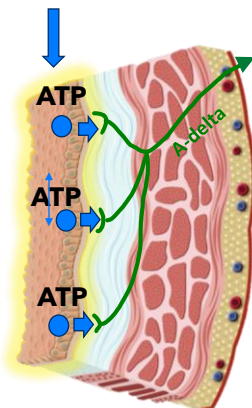


217

Causes of Increased Bladder Sensation

BACKGROUND POINTS TO REMEMBER ¹⁶⁻¹⁸

Urothelium



1. The A-delta sensory afferents are activated (giving sensation)....

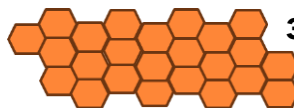
because the urothelial cells of the bladder mucosa experience stretch on bladder filling

→ production and release of ATP by urothelium

→ ATP binds to the A-delta sensory receptors

→ activates the nerve.

2. Urothelial cells are hexagonal in shape
when bladder is empty



3. stretch & become squamous
as the bladder fills



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Causes of Increased Bladder Sensation

IMPORTANT NOTE

It is the transmural pressure gradient... (pressure gradient across the cell's membrane) that is created when urothelial cells stretch... That determines the amount of ATP that is produced and therefore determines sensory activation

2. Urothelial cells are hexagonal in shape when bladder is empty

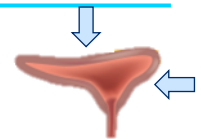
3. stretch & become squamous as the bladder fills

PELVICON

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Causes of Increased Bladder Sensation

CAUSE #1: EXTRINSIC PRESSURE ON BLADDER
 Causing disproportional deformation of urothelium
 eg from Uterine fibroids or Constipation



Normally when the bladder expands...

The uterus lifts to allow the bladder to expand symmetrically...

The uterus is heavier...

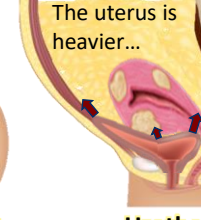
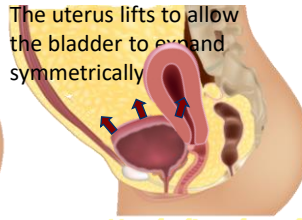
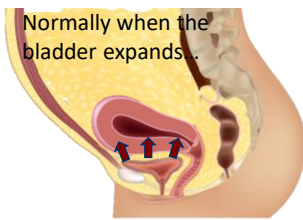
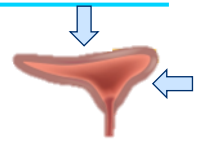
NOTE
 Fibroids cause a CONSISTENTLY HIGHER sensation relative to volume²⁶

Urothelium length = 18 inches	Urothelium length = 24 inches	= BIGGER STRETCH OF UROTHELIAL CELLS for same volume
200mls	200mls	
5in x 4in	4in x 2in	
A = 20in ²	A = 20in ²	

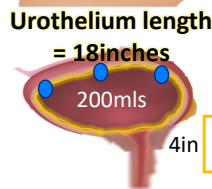
220

Causes of Increased Bladder Sensation

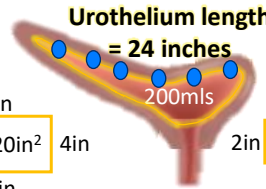
CAUSE #1: EXTRINSIC PRESSURE ON BLADDER
 Causing disproportional deformation of urothelium
 eg from Uterine fibroids or **Constipation**



NOTE
 Fibroids cause a **CONSISTENTLY HIGHER** sensation relative to volume²⁶



$$A = 20in^2$$

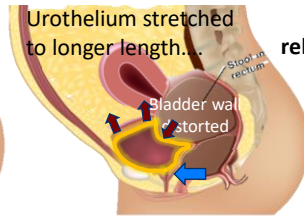
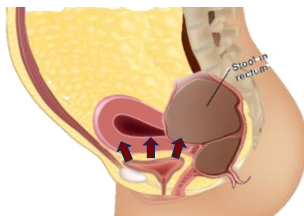
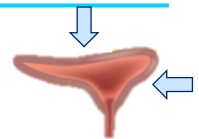


= BIGGER STRETCH OF UROTHELIAL CELLS for same volume
 10in
 $A = 20in^2$ 2in
 10in

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Causes of Increased Bladder Sensation

CAUSE #1: EXTRINSIC PRESSURE ON BLADDER
 Causing disproportional deformation of urothelium
 eg from Uterine fibroids or **Constipation**

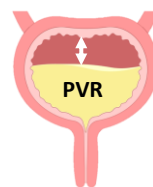


relative to urine volume → **INCREASED SENSORY SIGNAL**

The added problem with **outlet obstruction** constipation....

Possible compression of urethra → obstructed voiding

NOTE
 This is more likely to present with periods of time with increased sensation and other times / days with normal sensation



→ further worsening urinary frequency



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Constipation and OAB

however...

Panayi et al 2011²⁷

Found that compared to the rectum being empty...

Distension of the rectum resulted in: **FDV occurring at 46% lower bladder vol**
SDV occurring at 33% lower bladder vol

In addition, in patients with identified detrusor overactivity....

→ DO only occurred when the rectum was distended, not when rectum was empty

Akan et al 2020²⁸

n = 54 ♀ with both symptoms of OAB syndrome and functional constipation.

All patients were only treated for functional constipation

→ n = 13 (24%) no longer met criteria for OAB (based on OAB-V8 scores)

→ n = 36 (67%) had statistically significant reduction in OAB scores

→ only n = 5 (9%) had no change in symptoms

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Causes of Increased Bladder Sensation

There are also a lot of people with OAB symptoms who don't have
 fibroids or constipation



What else?



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Causes of Increased Bladder Sensation

CAUSE #2 Decreased Oestrogen Status

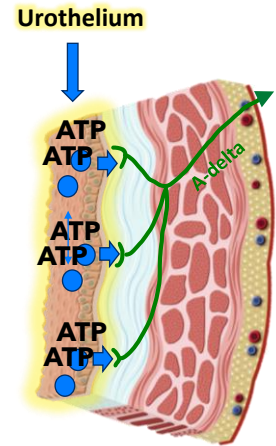
Urothelial cell compliance (ability to stretch), is known to reduce with decreasing oestrogen status.

Therefore.....the **lower the oestrogen**

→ the **higher** the urothelial **cell membrane tension** with stretch

→ the **higher** the resultant **ATP** release with stretch

→ the **greater** the activation of **sensory afferents** in response to a given stretch ²⁷⁻²⁹



Therefore... managing any genitourinary atrophy with topical oestrogen is vital for people presenting with ↑ed bladder sensation / urgency



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Oestrogen and OAB

Lin 2021³² performed a review of the literature and found that in women with symptoms of OAB after menopause, use of topical oestrogen resulted in:

- significantly increased bladder capacity
- significantly reduced urinary frequency and nocturia
- significantly decreased incidence of urgency episodes per day

Even more fascinating was that

There was no significant difference between antimuscarinic medication and topical oestrogen when prescribed for women with OAB symptoms after menopause

(with the obvious benefit that oestrogen therapy is not associated with dementia!)

NICE GUIDELINES 2019 ³³

1.4.37 Offer intravaginal oestrogens to treat overactive bladder symptoms in postmenopausal women with vaginal atrophy



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Causes of Increased Bladder Sensation

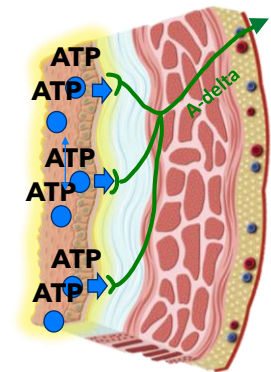
CAUSE #3 Fast Bladder Filling

It is now also known that **speed of stretch of urothelial cells** influences the degree of ATP production.

The faster the stretch of the urothelial cells

→ the greater the release of ATP at any given stretch

→ **the greater the sensation that will occur at any given volume**



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Diuresis Rate / Speed of Bladder Filling

Redmond et al 2019³⁴ found that in OAB patients:

BLADDER FILL RATE	Odds Ratio for Urgency
< 70mls / hr	reference
70 - 150mls / hr	2.03 (1.04 - 3.97)
> 150mls / hr	4.60 (1.74 - 12.1)

CLINICAL APPLICATION

It is important to minimise any excess fluid intake, that results in the kidneys going into a high diuresis
 Rx = reducing overall fluid intake (if safe to do so) and / or space fluid



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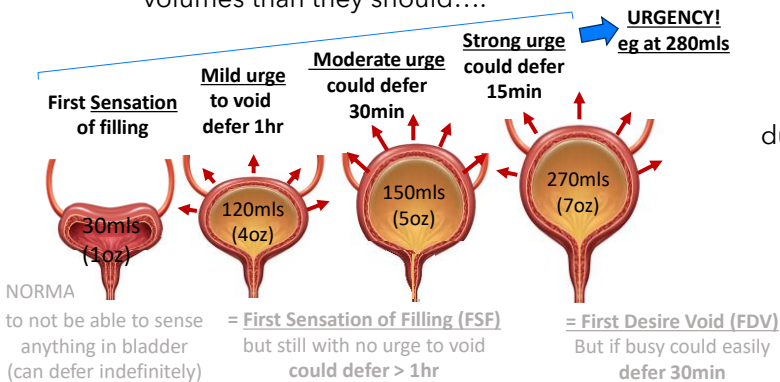
But let's go back for a minute...

229

Understanding Urgency

But this isn't how all urgency presents....

Occurs AFTER having all the usual 'bladder filling sensations' (FSF, FDV, SDV) at smaller volumes than they should....



'Bladder feels very full'

TYPE 1 URGENCY
Urgency linked to 'feeling like' **THE BLADDER IS REALLY FULL!!**

due to an underlying condition that causes **abnormally increased bladder sensation overall**

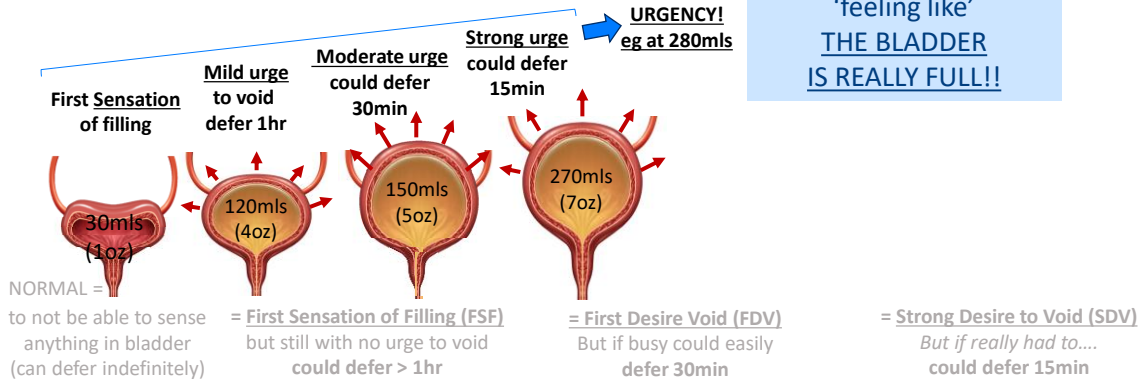
= **Strong Desire to Void (SDV)**
But if really had to... could defer 15min

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Understanding Urgency

TYPE 2 URGENCY¹⁴

TYPE 1 URGENCY
Urgency linked to
'feeling like'
THE BLADDER
IS REALLY FULL!!



231

Understanding Urgency

TYPE 2 URGENCY¹⁴

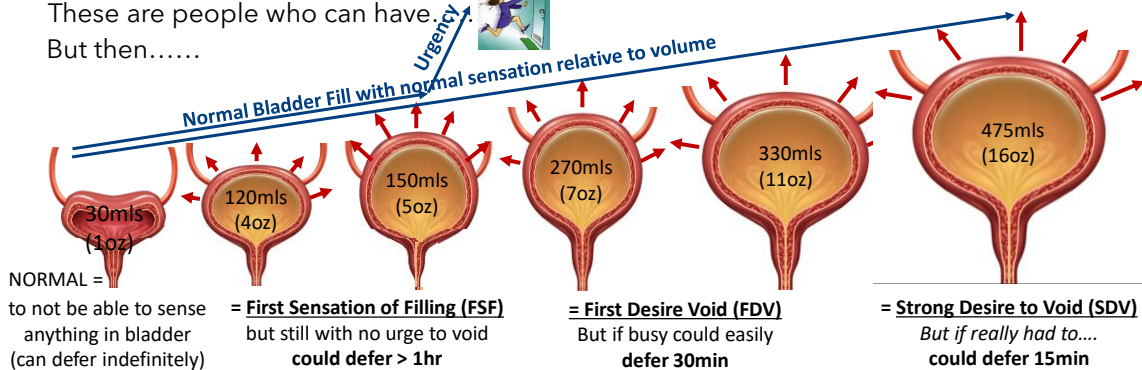
People feel 'urgency' to void even though they also can tell the BLADDER ISN'T FULL

in contrast, generally occurs in people with otherwise '**normal bladder sensation**'

CLINICAL TIP¹⁴

You can usually ask these people....
"When you get that urgent need to pass urine, does your bladder feel like it is full?"
They will usually answer.... "no, it doesn't"

These are people who can have. But then.....



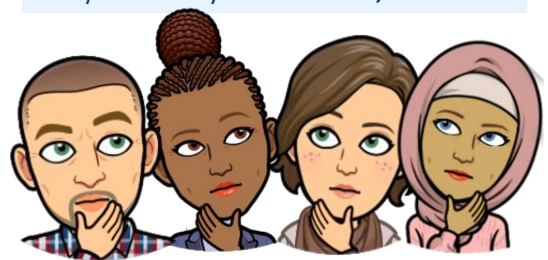
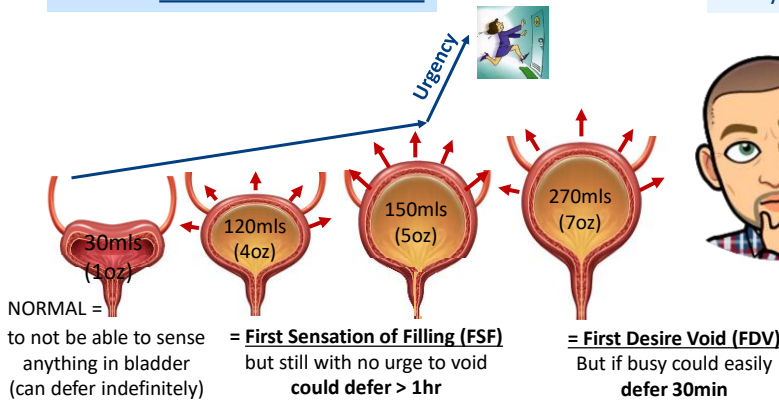
232

Understanding Urgency

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 People feel 'urgency' to void even though they also can tell the BLADDER ISN'T FULL

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 You can usually ask these people...
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IMPORTANT CLARIFICATION POINT

Urinary Urgency is defined by the ICS as *the complaint of a 'sudden, compelling desire to pass urine which is difficult to defer due to fear of leakage'* ^{4(p6)}

it is NOT defined as *the complaint of a sudden, compelling desire to pass urine which is difficult to defer due to the bladder feeling full*



234

Understanding Urgency

Not all 'urgency sensations' are a message from the bladder urothelium thinking it is full

You can have the bladder urothelium sending a message that it is only partially full...

.... whilst at the same time another sensory signal is being sent from the LUT to the brain to say the urine might be about to come out!

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Urinary Urgency is defined by the ICS as

the complaint of a 'sudden, compelling desire to pass urine which is difficult to defer due to fear of leakage'^{4(p6)}

it is NOT defined as

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What causes this?

NOTE These causes get really complex, ...we are only going to do a few

Not all 'urgency sensations' are a message from the bladder urothelium thinking it is full

You can have the bladder urothelium sending a message that it is only partially full...

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the complaint of a sudden, compelling desire to pass urine which is difficult to defer due to the bladder feeling full



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation / bladder doesn't feel full

CAUSE #1: **Urethral Urgency** ^{19,20}

Whilst the pathophysiology of urgency is almost always assumed to be related to sensory signals from the bladder

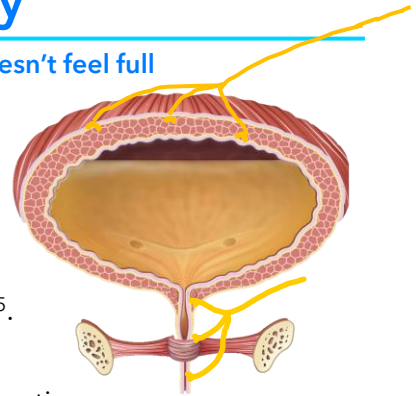
It is increasingly being acknowledged that activation of **urethral sensory afferents** may also play a significant role³⁵.

Note:

Sensory signals from the urethra are a normal part of LUT function

- people can normally 'sense' urine moving through the urethra during voiding
- urethral urothelial cells actually facilitate detrusor contraction during voiding via the urethro-vesical communication reflex ³⁵

Note 2: this then leads to a range of possible 'sub-causes' of urgency



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation / bladder doesn't feel full

CAUSE #1: **Urethral Urgency** ^{19,20}

Sub-cause 1.1: **Urethral Instability** ³⁶⁻³⁹

Urethral pressure measurements have shown that OAB patients may display a sudden decrease in urethral pressure

- reduction in urethral closure message to brain
- brain interprets as "GET TO TOILET"

Kirschner-Hermanns et al 2017 ³⁷

- Found that amongst women with OAB Syndrome
- Urethral instability occurred in 79.3% of patients
- the average drop in UP was 36.5cmH₂O

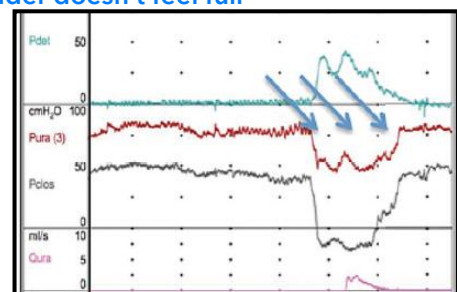


Figure 1 from Kirschner-Hermanns et al 2017

**But why does
this happen??**



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

CAUSE #1: Urethral Urgency

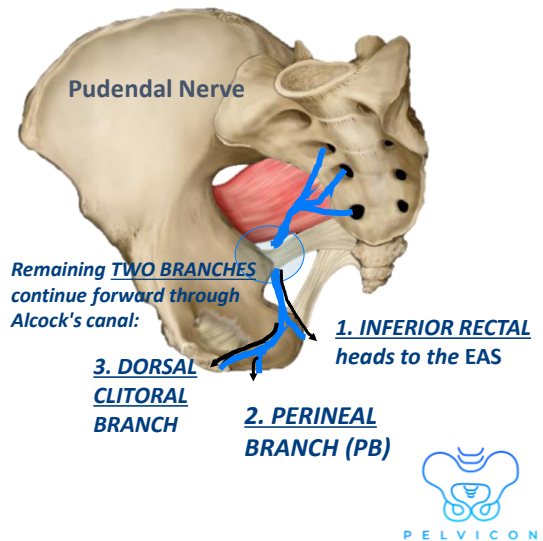
Sub-cause 1.1: Urethral Instability

MECHANISM: still uncertain / unknown

THEORY ²⁰

Intermittent compression of pudendal nerve

→ I/T reduction in motor nerve signal to EUS



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

CAUSE #1: Urethral Urgency

Sub-cause 1.1: Urethral Instability

MECHANISM:

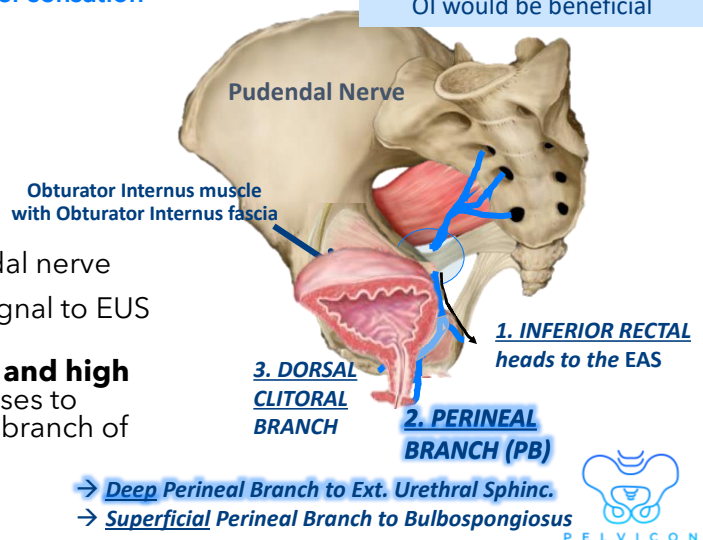
THEORY ²⁰

Intermittent compression of pudendal nerve

→ I/T reduction in motor nerve signal to EUS

Questioned whether **high tone PF and high tone Obturator Internus** predisposes to abnormal compression of perineal branch of pudendal nerve in Alcock's canal

→ Urethral Instability



CLINICAL APPLICATION

If this theory is true, it would suggest down-training LA and OI would be beneficial

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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

CAUSE #1: Urethral Urgency

Sub-cause 1.2: **Bladder Neck Funnelling with \uparrow IAP**^{20,40}

Weakness of the upper parts of the urethral sphincters combined with poor LAM tensioning of posterior urethral fascial support

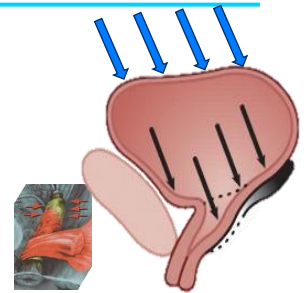
→ opening of the upper urethra (ie funnelling) during times of increased intra-abdominal pressure

→ Brain hears: *'urine is entering upper urethra so must be about to come out*

→ person interprets as "URGENT" need to get to the toilet

Note: This is particularly likely in people whose 'urgency' suddenly increases during time of \uparrow IAP eg when standing from a chair, or if they cough.

ie increases in IAP → bladder neck funnelling → 'URGENCY'



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

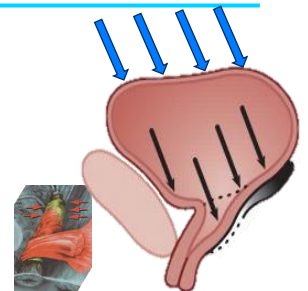
CAUSE #1: Urethral Urgency

Sub-cause 1.2: **Bladder Neck Funnelling with \uparrow IAP**^{20,40}

Hubeaux et al 2012: "Stand-Up Urgency"⁴⁰

Found that people whose urgency was triggered by changing from sitting or lying to standing

- was NOT associated with Detrusor Overactivity
- was associated with having a lower URETHRAL CLOSURE PRESSURE



CLINICAL APPLICATION POINT

These are the people it makes sense to do PFMT (focusing on both Levator Ani and Urethral sphincter) or provide a pessary to support the bladder neck
→ reduction in urgency

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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

Sub-cause 1.3: **Urethral Urgency from Abnormal Cortical Trigger of Micturition** ²⁰

It is now accepted that the nervous system is highly adaptive:

→ neuronal sprouting allows new pathways to form.....

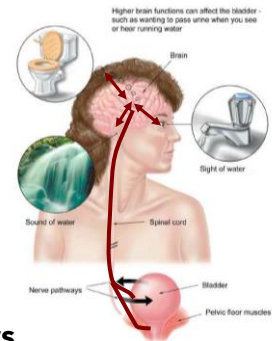
and neuronal pruning allows unused pathway to be deleted

Unfortunately, neuronal sprouting can result in abnormal cortical links being formed between two events that regularly occur together

eg if a certain visual or auditory stimulus is regularly followed by activation of micturition reflex

→ neuronal sprouting will **link the two neuronal pathways into a new reflex arc**

→ **creation of stimulus activated (rather than bladder stretch activated) neural pathway for micturition initiation**



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

Sub-cause 1.3: **Urethral Urgency from Abnormal Cortical Trigger of Micturition** ²⁰

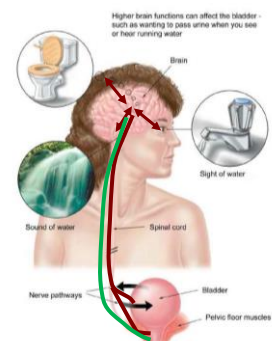
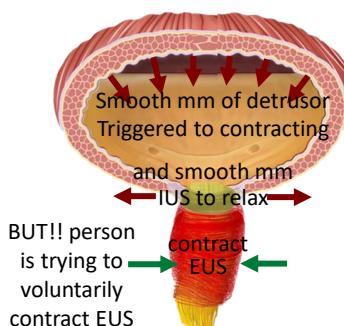
NOTE

INVOLUNTARY FIRING

of micturition reflex when a person doesn't want to void....

(eg trigger initiated with key in the door)

is a unique physiological event different to what happens in voluntary voiding



244

Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

Sub-cause 1.3: **Urethral Urgency from Abnormal Cortical Trigger of Micturition** ²⁰

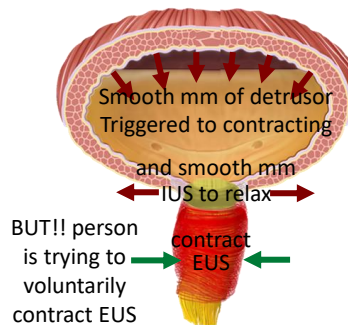
NOTE

INVOLUNTARY FIRING

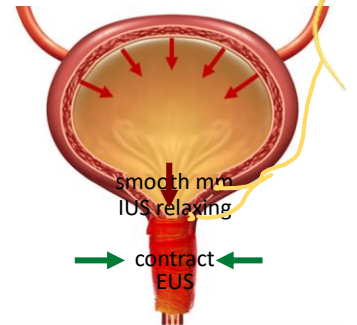
of micturition reflex when a person doesn't want to void....

(eg trigger initiated with key in the door)

is a unique physiological event different to what happens in voluntary voiding



BUT!! You can't train the person to contract the IUS to stop the upper urethral funneling



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Causes of Sudden Onset Urgency

in people with otherwise normal bladder sensation

Sub-cause 1.3: **Urethral Urgency from Abnormal Cortical Trigger of Micturition** ²⁰

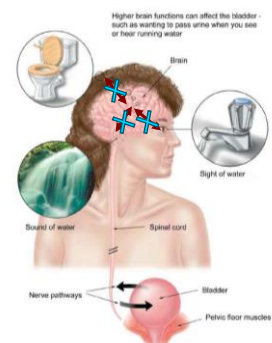
TREATMENT

Requires 'neuronal pruning' over time of the abnormal cortical link that has been created

Simply involves not allowing the micturition reflex neurones to ever fire at the same time as the auditory / visual stimulus

ie **use of 'urgency suppression' strategies at time of trigger**
eg toe curling, perineal pressure, distraction etc

to enable the patient to 'not go to the toilet'
at the time of the trigger
(ie not activate micturition reflex neurones)

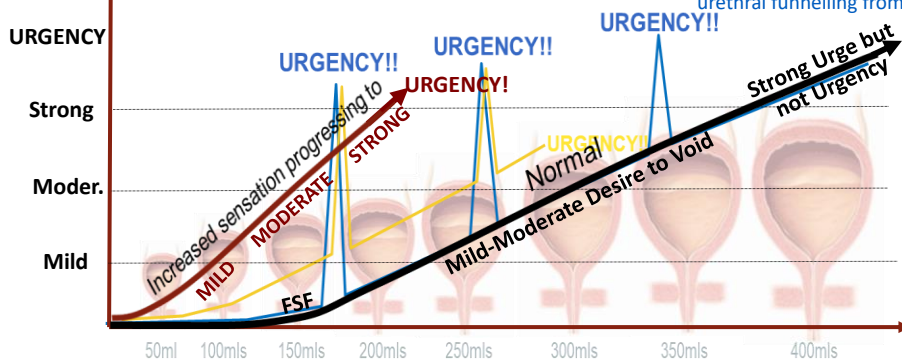


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VISUAL SUMMARY SO FAR...

TYPE 1 URGENCY commonly "secondary" to something causing an overall 'increased bladder sensation' at all volumes eg low oestrogen, constipation, fibroids, low compliance bladder from scarring or radiation etc

TYPE 2 URGENCY commonly a sudden "out of nowhere" urgency despite being able to sense they are not full (ie they are getting otherwise normal bladder sensation) eg abnormal cortical neural links, urethral instability, urethral funnelling from increases in IAP



However unfortunately there are also... people who have a mix of the two, who probably have multiple underlying causes that all need to be treated to get improvements.

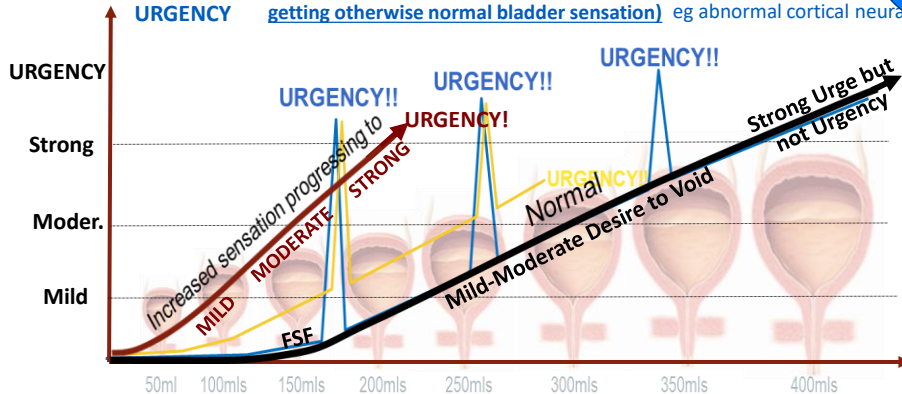


247

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But as pelvic health rehab providers, how do WE work out which one our patients have?



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VISUAL SUMMARY SO FAR

TYPE 1 URGENCY commonly “secondary” to something causing an overall ‘increase’ in urgency eg low oestrogen, constipation, fibroids, low compliance bladder function etc

TYPE 2 URGENCY commonly a sudden “out of nowhere’ urgency despite being able to suppress the urge (eg getting otherwise normal bladder sensation) eg abnormal cortical neuronal activity, etc

But as pelvic health rehab providers, how do WE work out which one our patients have?

A lot of it requires....

1. Really detailed history taking to determine what the urgency actually feels like, when it happens etc
2. Assessment for other factors (constipation etc)
3. Assessment for post void residuals
4. Assessment of PFM, OI and Urethral Sphincter function

BUT EVEN MORE IMPORTANT IS.....



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Sensation Related Bladder Diary

references 41 - 46

Similar to a standard bladder diary, except that in addition to reporting

- time of each void
- incontinence episodes
- urine output (void vol)
- fluid intake

the patient also reports...

- **sensation / desire to void** associated with each void

TIME	Sensation (0-4)	Urine output (mls)	Fluid intake (mls)
6.40am	3	330ml	200mls water
7.45am	2	120mls	200mls water
9.10am	2	160mls	200mls juice
10.30am	2	190ml	200mls water
1.40pm	3	220mls	300mls coffee
3.00pm	4	100mls	
4.15pm	2	210mls	150mls water
7.30pm	3	240mls	150mls wine
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2.00am	4	350mls	
6.20am	3	290mls	



250

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		4	100mls	
		2	210mls	150mls water
		3	240mls	150mls wine
10.15pm		2	120mls	150mls water
2.00am	small	4	350mls	
6.20am		3	290mls	

HOWEVER!!!

To be able to reliably analyse sensation , you do need to use a research validated sensation scale that has been shown comparable to cystometry



251

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side note: Bladder Diary Sensation Scales

There are two broad types of '**sensation scales**' you will commonly see used in bladder diaries **in the research** (that have had validity and reliability checked)

Urgency / OAB Specific Scales

- specifically used in research trials with patients already diagnosed as OAB
 - eg Indevus Urgency Scale
 - Patient Perception of Urgency Scale
- do not grade FSF, FDV or SDV, therefore cannot determine increased bladder sensation, reduced bladder sensation, absent bladder sensation etc
- **instead.... allocates 'grades of urgency'** to be able to monitor improvement in urgency

General Bladder Sensation Scales

- provides gradings for each of the 'normal bladder sensations' (FSF, FDV, SDV) as well as urgency
- can be used to assess all types of bladder sensation presentations
 - normal bladder sensation
 - reduced bladder sensation
 - increased bladder sensation
 - absent bladder sensation
 and
 - urgency / OAB



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CLINICAL TIP

There are two broad types of '**sensation scales**' you will commonly see used in bladder diaries **in the research** (that have had validity and reliability checked)

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 - normal bladder sensation
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 - increased bladder sensation
 - absent bladder sensation
 and
 - urgency / OAB



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CLINICAL TIP

Whilst you will see these a lot in OAB research, they are not actually very useful in clinical practice

Urgency / OAB Specific Scales

- specifically used in research trials with patients already diagnosed as OAB

So let's review using this to help clarify our diagnosis in clinic
eg. Indevus Urgency Scale
Patient Perception of Urgency Scale

- do not grade FSF, FDV or SDV, therefore cannot determine increased bladder sensation, reduced bladder sensation, absent bladder sensation etc
- **instead.... allocates 'grades of urgency'** to be able to monitor improvement in urgency

In contrast, these scales allow you to assess **for ALL TYPES of sensory dysfunction**

General Bladder Sensation Scales

- provides gradings for each of the 'normal bladder sensations' (FSF, FDV, SDV) as well as urgency
- can be used to assess all types of bladder sensation presentations
 - normal bladder sensation
 - reduced bladder sensation
 - increased bladder sensation
 - absent bladder sensation and
 - urgency / OAB

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SR-BD with a General Bladder Sensation Scale

'GENERAL BLADDER SENSATION SCALE'

Developed by De Wachter and Wyndaele in 2003⁴², it is now the most common 'general bladder sensation scale' used in the research, that is validated for clinical practice

Testing showed people could then reliably use the scale

Originally based off the urodynamic cystometry assessment:

CYSTOMETRY MEASURE	SR-BD Bladder Sensation Scale		ability to defer
<small>These terms are too difficult for patients</small>	0	'feels like no urine in bladder'	-
First Sensation of Filling (FSF)	= 1	'mild sensation, no urge to void'	≥ 1hour
First Desire to Void (FDV)	= 2	'moderate urge to void'	≥ 30min
Strong Desire to Void (SDV)	= 3	'strong urge to void'	≥ 15min
	4	'urgency'	< 5min!

However.... When they did pilot tests on the scale, they found that people found the descriptors very vague, finding it hard to know when to move from 1 → 2 → 3



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SR-BD with a General Bladder Sensation Scale

IMPORTANT

This is the scale used on a SR-BD

SR-BD Bladder Sensation Scale		ability to defer
0	'feels like no urine in bladder'	-
1	'mild sensation, no urge to void'	≥ 1hour
2	'moderate urge to void'	≥ 30min
3	'strong urge to void'	≥ 15min
4	'urgency'	< 5min!



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SR-BD with a General Bladder Sensation Scale

INITIAL BLADDER DIARY

To enable a complete assessment of your current symptoms, it is important for your physiotherapist to gain a thorough understanding of how your bladder is currently functioning. Therefore, it would be appreciated if you could complete the following **Bladder Diary for 48hours**.

INSTRUCTIONS:

Each time you go to the toilet to pass urine write down:

- Time** eg. 9.30am
- Interval** Write how long it has been since the last time you went to the toilet. eg. 2hrs, 45min

3. Rate How Strong Your Urge to Pass Urine was from 0-4

- 0 = No Sensation of urine in bladder at all
- 1 = Sensation of some urine but no desire to void eg. could delay 1hour
- 2 = Mild-Moderate Desire to void eg. could delay 30min
- 3 = Strong Desire to Void eg. couldn't delay >15min
- 4 = Urgent Desire to Void eg. unable to delay 5min

4. Volume of Urine Passed

- Urine: **Measure the amount of urine in mls** ("cc" on specipan measure)

Measurement of Urine

AUS = mls

USA = oz?

(1oz = ~30mls)



258

SR-BD with a General Bladder Sensation Scale

INITIAL BLADDER DIARY

To enable a complete assessment of your current symptoms, it is important for your physiotherapist to gain a thorough understanding of how your bladder is currently functioning. Therefore, it would be appreciated if you could complete the following Bladder Diary for 48hours.

INSTRUCTIONS:

Each time you go to the toilet to pass urine write down:

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2. **Interval** Write how long it has been since the last time you went to the toilet. eg. 2hrs, 45min
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 - 4 = Urgent Desire to Void eg. unable to delay 5min

4. Volume of Urine Passed

- Urine: **Measure the amount of urine in mls** ("cc" on speciman measure)

Measurement of Urine

But!!!!

You can't use
duration of the flow in seconds

why?

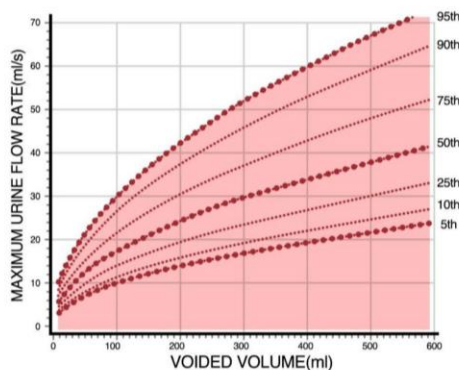


259

SR-BD with a General Bladder Sensation Scale

REASON #1

Even in normals, flow rate varies depending on the volume you start with in our bladder ⁴⁷



17. Liverpool nomogram

Measurement of Urine

But!!!!

You can't use
duration of the flow in seconds

in addition....



260

SR-BD with a General Bladder Sensation Scale

REASON #2

Many people with OAB also have some time of voiding dysfunction (obstructed / intermittent voiding, or slow urine stream)...⁴⁸⁻⁵⁰

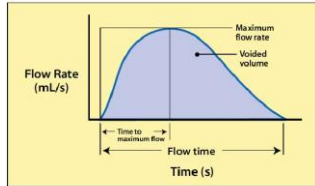
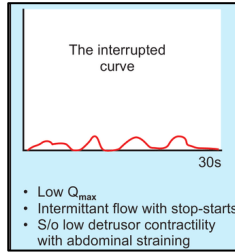
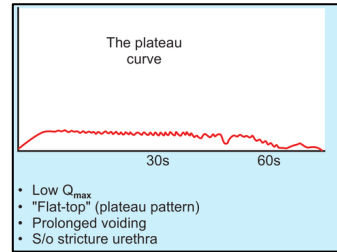


Fig. 1. Flow pattern of urine.

Normal



- Low Q_{max}
- Intermittent flow with stop-starts
- S/o low detrusor contractility with abdominal straining



- Low Q_{max}
- "Flat-top" (plateau pattern)
- Prolonged voiding
- S/o stricture urethra

...making the number of seconds not at all reliable for volume



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SR-BD with a General Bladder Sensation Scale

INITIAL BLADDER DIARY

To enable a complete assessment of your current symptoms, it is important for your physiotherapist to gain a thorough understanding of how your bladder is currently functioning. Therefore, it would be appreciated if you could complete the following **Bladder Diary for 48hours**.

INSTRUCTIONS:

Each time you go to the toilet to pass urine write down:

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- 2. Interval** Write how long it has been since the last time you went to the toilet. eg. 2hrs, 45min
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4. Volume of Urine Passed

- Urine: **Measure the amount of urine in mls** ("cc" on specipan measure)

Measurement of Urine

AUS = mls

USA = oz

(1oz = ~30mls)



262

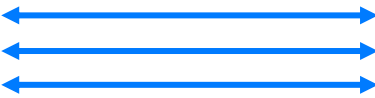
QUESTION

SR-BD vs Cystometry
are the results comparable?

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Assessing Bladder Sensation: Cystometry vs SR-BD

De Wachter and Wyndaele 2003 **compared values** across both assessments

Cystometry average			SR-BLADDER DIARY averages	
No Sensation		VERY SIMILAR!  note	110mls	0
FSF	190mls		206mls	1
FDV	268mls		303mls	2
SDV	410mls		402mls	3
Urgency	not assessed		537mls	4

These were just the **'average' volume** for each sensation
There is a fairly large range for each sensation that is normal



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Assessing Bladder Sensation: Cystometry vs SR-BD

De Wachter and Wyndaele 2003 **compared values** across both assessments

Cystometry average		+ / - 2 standard deviations
No Sensation		
FSF	190mls	100 - 280
FDV	268mls	150 - 385
SDV	410mls	260 - 550
Urgency	not assessed	

+ / - 2 Standard deviation	SR-BLADDER DIARY averages	
50 - 170	110mls	0
110 - 300	206mls	1
190 - 410	303mls	2
270 - 540	402mls	3
400 - 600	537mls	4

STILL VERY SIMILAR!

VALID SCALE COMPARED TO CYSTOMETRY!

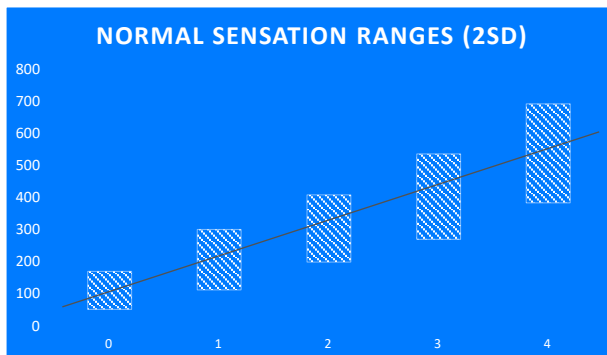


SR-BD Bladder Sensation Scale		ability to defer
0	'feels like no urine in bladder'	-
1	'mild sensation, no urge to void'	≥ 1hour
2	'moderate urge to void'	≥ 30min
3	'strong urge to void'	≥ 15min
4	'urgency'	< 5min!

265

Assessing Bladder Sensation: Cystometry vs SR-BD

De Wachter and Wyndaele 2003 **compared values** across both assessments



VALID SCALE COMPARED TO CYSTOMETRY!

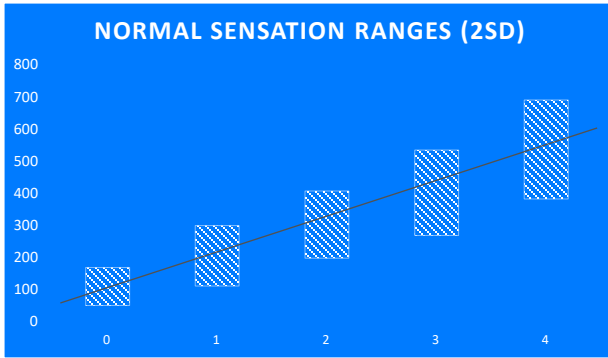
+ / - 2 Standard deviation	SR-BLADDER DIARY averages	
50 - 170	110mls	0
110 - 300	206mls	1
190 - 410	303mls	2
270 - 540	402mls	3
390 - 600	537mls	4

SR-BD Bladder Sensation Scale		ability to defer
0	'feels like no urine in bladder'	-
1	'mild sensation, no urge to void'	≥ 1hour
2	'moderate urge to void'	≥ 30min
3	'strong urge to void'	≥ 15min
4	'urgency'	< 5min!

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Assessing Bladder Sensation: Cystometry vs SR-BD

De Wachter and Wyndaele 2003 **compared values** across both assessments



← THESE ARE WHAT YOU USE IN CLINIC

SR-BD Bladder Sensation Scale		ability to defer
0	'feels like no urine in bladder'	-
1	'mild sensation, no urge to void'	≥ 1hour
2	'moderate urge to void'	≥ 30min
3	'strong urge to void'	≥ 15min
4	'urgency'	< 5min!

But what type of urgency?

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'2-Day' Sensation Related - Bladder Diary

DAY 1					DAY 2							
Day / Date		Time Woke Up		Time Went to Sleep		Day / Date		Time Woke Up		Time Went to Sleep		
Fri, 2nd March					Sat 3rd March							
Time Woke Up 6.30am					Time Woke Up 6.45am							
Time Went to Sleep 10.45pm					Time Went to Sleep 11.30pm							
BLADDER FUNCTION					FLUID INTAKE							
TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO	TIME	Type	Volume	TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO
6.35am	4hrs 00min	3	s/a	390mls	6.45	Tea	250mls	6.50am	4hr 50min	3		210mls
7.25am	50min	2		730mls / BO	7.30	Tea	250mls	7.30am	40min	0		710mls / BO
8.40am	1hr 15min	2		190mls	9.30	Coffee	350mls	8.45am	1hr 10min	2		175mls
10.10am	1hr 30min	3		220mls				11.10am	2hr 25min	4		310mls
12.20pm	2hr 10min	2		150mls	12.00	Water	375mls	1.05pm	1hr 55min	3		270mls
1.00pm	40min	4	s/a	60mls				1.40pm	40min	1		60mls
3.30pm	2hr 30min	3		240mls	3.30pm	Water	300mls	3.05pm	1hr 25min	3		220mls
5.15pm	1hr 45min	2		160mls	4.15pm	Water	200mls	5.30pm	2hr 25min	4	m/a	75mls
6.00pm	45min	4		110mls	7.45pm	Wine	150mls	7.30pm	2hr 00min	2		140mls
8.00pm	2hr 00min	2						3.00am	3hr 35min	3		310mls
10.00pm	2hr 00min	3										
10.40pm	40min	1										
2.00am	3hr 20min	3		345mls								

Interestingly.... their episodes that they 'leak with urgency, are often at smaller volumes than many of their other voids

DAY 1 Day Frequency = 12
 Nocturia = 1
 Urgency Episodes x 2 with x 1 UUI

DAY 2 Day Frequency = 12
 Nocturia = 1
 Urgency x 2 with x 1 UUI



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So the question is....

DAY 1

Day / Date Fri, 2nd March Time Woke Up 6:30am Time Went to Sleep 10:45pm

BLADDER FUNCTION					FLUID INTAKE		
TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO	TIME	Type	Volume
6:35am	4hrs 00min	3	s/a	390mls	6:45	Tea	250mls
7:25am	50min	2		730mls / BO	7:30	Tea	250mls
8:40am	1hr 15min	2		190mls	9:30	Coffee	350mls
10:10am	1hr 30min	3		220mls			
12:20pm	2hr 10min	2		150mls	12:00	Water	375mls
1:00pm	40min	4	s/a	60mls			
3:30pm	2hr 30min	3		240mls	3:30pm	Water	300mls
5:15pm	1hr 45min	2		160mls	4:15pm	Water	200mls
6:00pm	45min	4		110mls	7:45pm	Wine	150mls
8:00pm	2hr 00min	2		150mls			
10:00pm	2hr 00min	3		200mls	10:00pm	Tea	250mls
10:40pm	40min	1		80mls			
2:00am	3hr 20min	3		345mls			

DAY 2

Day / Date Sat 3rd March Time Woke Up 6:45am Time Went to Sleep 11:30pm

BLADDER FUNCTION					FLUID INTAKE		
TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO	TIME	Type	Volume
6:50am	4hr 50min	3		210mls			
7:30am	40min	0		710mls / BO	7:15am	Tea	250mls
8:45am	1hr 10min	2		175mls	8:30am	Coffee	200mls
11:10am	2hr 25min	4		310mls	11:15am	Water	200mls
1:05pm	1hr 55min	3		270mls	1:15pm	Water	275mls
1:40pm	40min	1		60mls			
3:05pm	1hr 25min	3		220mls	3:30pm	Water	150mls
5:30pm	2hr 25min	4	n/a	75mls	4:30pm	Water	250mls
7:30pm	2hr 00min	2		140mls	7:00pm	Wine	150mls
9:00pm	1hr 30min	2		150mls	8:30pm	Wine	150mls
11:00pm	2hr 00min	2		210mls	11:00pm	Tea	250mls
11:25pm	25min	1		80mls			
3:00am	3hr 35min	3		310mls			



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Is their overall LUT sensation normal / abnormal?

DAY 1

Day / Date Fri, 2nd March Time Woke Up 6:30am Time Went to Sleep 10:45pm

BLADDER FUNCTION					FLUID INTAKE		
TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO	TIME	Type	Volume
6:35am	4hrs 00min	3	s/a	390mls	6:45	Tea	250mls
7:25am	50min	2		730mls / BO	7:30	Tea	250mls
8:40am	1hr 15min	2		190mls	9:30	Coffee	350mls
10:10am	1hr 30min	3		220mls			
12:20pm	2hr 10min	2		150mls	12:00	Water	375mls
1:00pm	40min	4	s/a	60mls			
3:30pm	2hr 30min	3		240mls	3:30pm	Water	300mls
5:15pm	1hr 45min	2		160mls	4:15pm	Water	200mls
6:00pm	45min	4		110mls	7:45pm	Wine	150mls
8:00pm	2hr 00min	2		150mls			
10:00pm	2hr 00min	3		200mls	10:00pm	Tea	250mls
10:40pm	40min	1		80mls			
2:00am	3hr 20min	3		345mls			

DAY 2

Day / Date Sat 3rd March Time Woke Up 6:45am Time Went to Sleep 11:30pm

BLADDER FUNCTION					FLUID INTAKE		
TIME	INTERVAL	URGE (0-4)	Leakage	Urine Vol / BO	TIME	Type	Volume
6:50am	4hr 50min	3		210mls			
7:30am	40min	0		710mls / BO	7:15am	Tea	250mls
8:45am	1hr 10min	2		175mls	8:30am	Coffee	200mls
11:10am	2hr 25min	4		310mls	11:15am	Water	200mls
1:05pm	1hr 55min	3		270mls	1:15pm	Water	275mls
1:40pm	40min	1		60mls			
3:05pm	1hr 25min	3		220mls	3:30pm	Water	150mls
5:30pm	2hr 25min	4	n/a	75mls	4:30pm	Water	250mls
7:30pm	2hr 00min	2		140mls	7:00pm	Wine	150mls
9:00pm	1hr 30min	2		150mls	8:30pm	Wine	150mls
11:00pm	2hr 00min	2		210mls	11:00pm	Tea	250mls
11:25pm	25min	1		80mls			
3:00am	3hr 35min	3		310mls			

IMPORTANT NOTE

To assess sensation, **we only use voids where bladder was filling when awake**



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NOTE

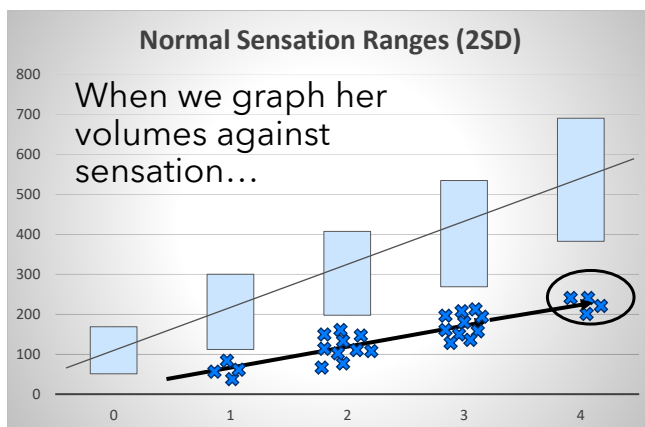
The next three slides are **not** the graphs of the specific SR-bladder diary I just showed you

I am now simply showing you how **various different SR-bladder diaries** may come out on a graph, and what they tell you

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Example #1

58yo cis-female presents with: **Frequency 14/day** (total 28voids in 2 days)
with **2 voids /day linked with 'urgency'**



She has increased bladder sensation generally (all voids).

and, all her urgency episodes appear related to her overall increased bladder sensation

Consider causes such as:

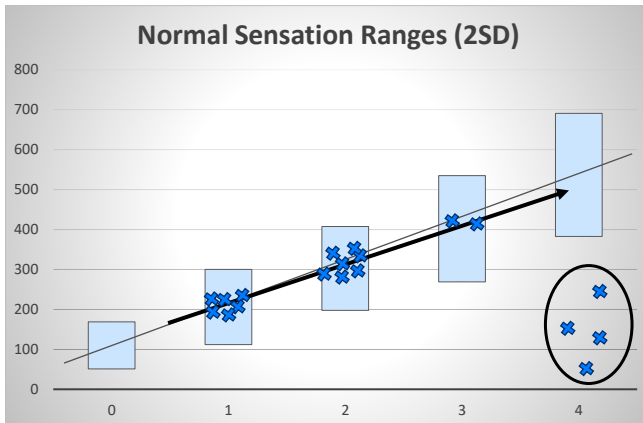
- low oestrogen
- chronic constipation or fibroids
- high post-void residual
- excess fluid intake
- low compliance bladder



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Example #2

36yo cis-female presents with: **Frequency 9/day** (total 18voids in 2 days)
including **2 out of 9 voids /day with urgency**



General bladder sensation is fine!

Urgency not related to bladder fullness (Type 2)

Consider other causes:

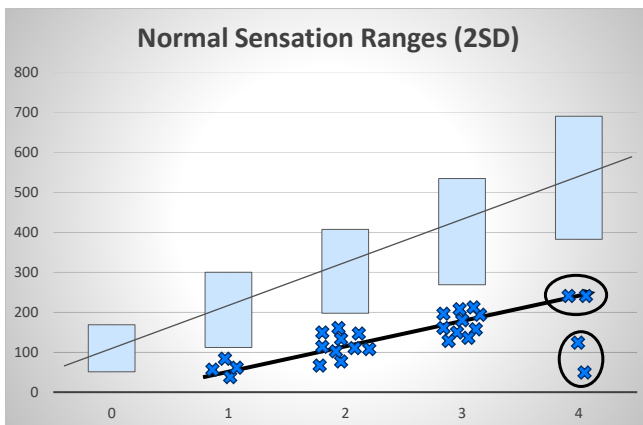
- Abnormal Cortical Triggers
- Urethral Instability / High Tone PF
- Poor LAM/ Ureth Sphinc / Fascial support
→ BN funneling with ↑IAP
- Intermittent fluid loading with long spaces between
- Bladder Irritants



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Example #3

70yo cis-female presents with: **Frequency 10/day** (total 20voids in 2 days)
including **2 out of 10 voids /day with urgency**



This woman has AT LEAST two different pathophysiological mechanisms going on:

1. One mechanism that is causing her to have increased bladder sensation overall
2. One mechanism that is causing her to have urgency at random volumes separate to her 'bladder filling sensations'

NEED TO WORK OUT
AND TREAT BOTH



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KEY TAKE-HOME MESSAGES

- **OVERACTIVE BLADDER SYNDROME (OAB)** is a symptom syndrome term given to any person who presents with urgency +/- frequency, nocturia and UUI
- It is a **SENSORY DISORDER** that may or may not have a co-existing motor dysfunction (detrusor overactivity, urethral sphincter insufficiency, abnormal micturition reflex trigger)
- **TREATMENT PLAN** requires first working out the **UNDERLYING CAUSE**.....

ie the Mensa Test of PF Rehab!

- it is important to do a very **DETAILED HISTORY** and a **SENSATION RELATED BLADDER DIARY** to start your clinical reasoning



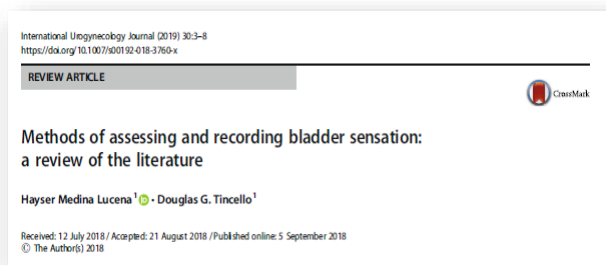
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FINAL NOTE.... TWO AMAZING PAPERS



Last I looked....
The published article (in journal) is not free....

But the **unpublished manuscript** (with all the written content but without images) was still **free on google scholar**



Last I looked....
Access to this was **Free via google scholar**



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THE END

Thank you so much for
having me 😊

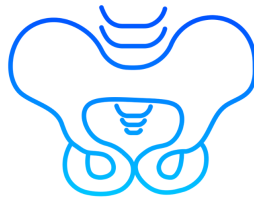
Taryn Hallam
WHTA Pty Ltd



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Q&A



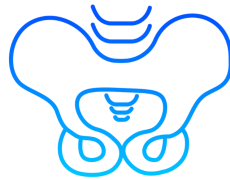
P E L V I C O N



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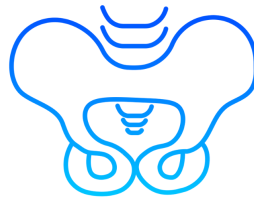
Giveaway!



P E L V I C O N

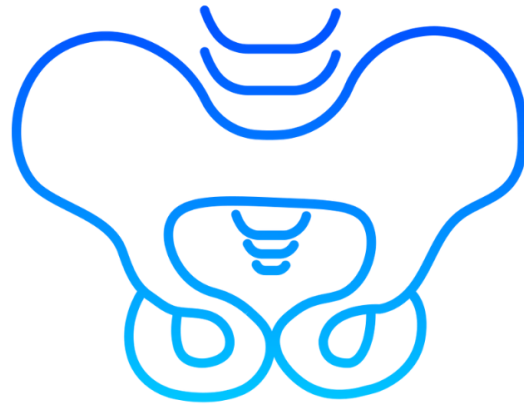
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Lunch & Vendor Hall



P E L V I C O N

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P E L V I C O N

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Beyond the Beam: Post-Pelvic Radiation Therapy Considerations

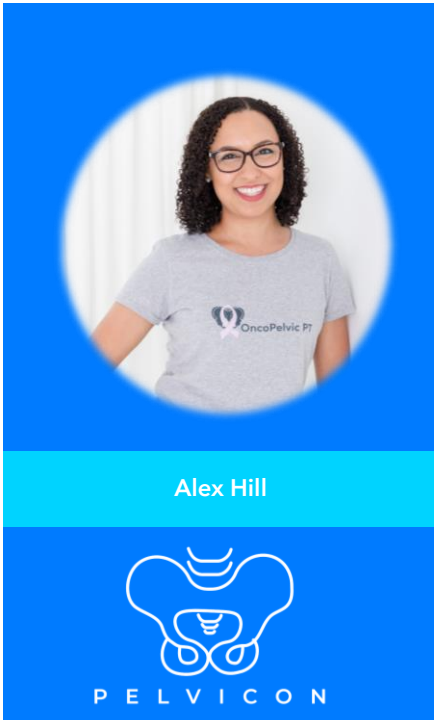
Alexandra Hill, PT, DPT, OnCS,
WCS, CLT-LANA



P E L V I C O N

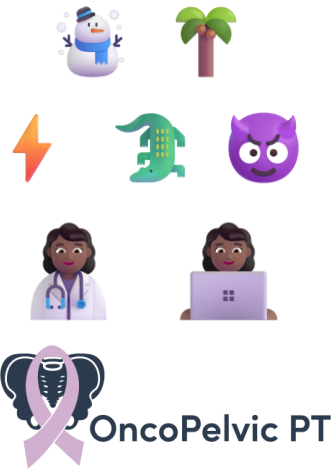


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About Me



Disclosures

- Owner of OncoPelvic PT, LLC
- Contractor with Tactile Medical
- Affiliate with Amazon, Intimate Rose, Soul Source Therapeutics, The Pelvic People, Prairie Wear, BrightLife Direct



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Objectives

By the end of this course, the learner will be able to:

1. Describe common pelvic radiation therapy side effects
2. Identify precautions and contraindications related to radiation therapy
3. Discuss rehab interventions for musculoskeletal-related side effects from radiation therapy



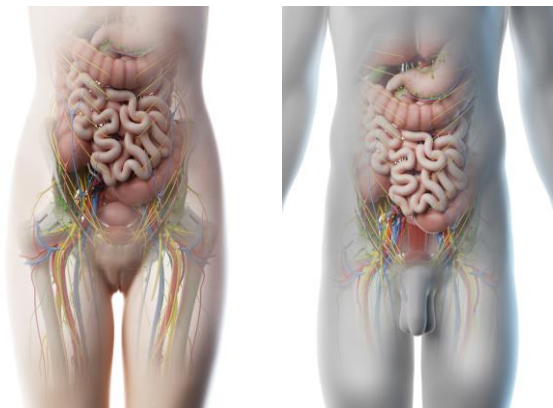
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Pelvic Cancers

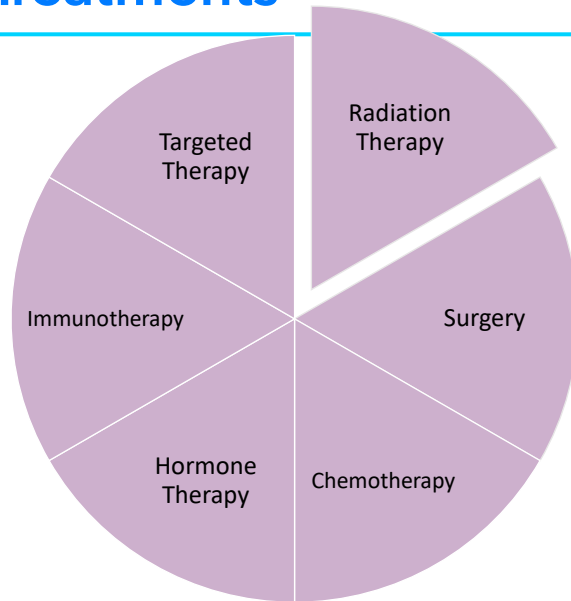
- **Gastrointestinal:** colorectal, anal, esophageal, gastric, gallbladder, liver, pancreatic
- **Gynecological:** cervical, ovarian, uterine, vaginal, vulvar
- **Urogenital:** bladder, kidney, prostate, penile, testicular



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Cancer Treatments

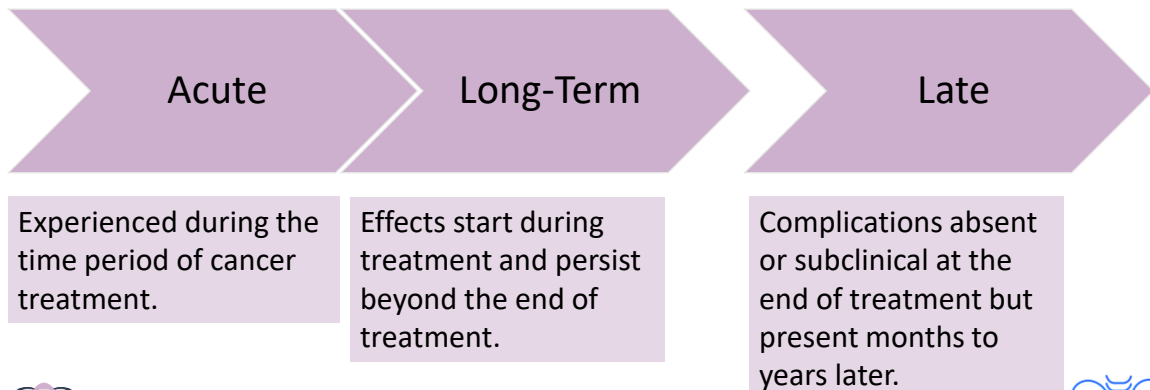


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Effects of Cancer Treatments



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Radiation Therapy

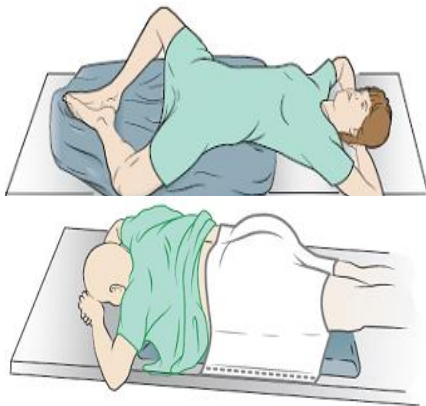
- High energy x-rays that destroy local cancer cells by inhibiting cell growth and division
- **Neo-Adjuvant:** treatment started prior to surgery to shrink the tumor
- **Adjuvant:** treatment started after surgery to kill remaining cancer cells
- **Palliative:** shrink metastatic lesions, slow down its growth, or control symptoms caused by the cancer



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<https://www.mskcc.org/cancer-care/patient-education/radiation-therapy-pelvis>



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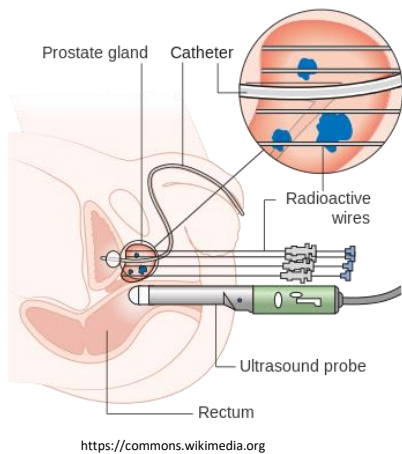
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Radiation Therapy: External Beam

- The total radiation dose is usually divided into several fractions
- Each fraction will contain a small amount of radiation that gradually accumulates to form the total dose.
- Typically given in daily dosages of 5-10 minutes over a period of 4-6 weeks

Burt SM 2023





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Radiation Therapy: Brachytherapy

- Radiation therapy delivered internally and directly into the tissues with seeds, wires, ribbons, or tandem
- May be in place for hours, days, or even permanently
- Most often utilized for prostate cancer and cervical cancer

Burt SM 2023



PELVICON

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Radiation Therapy Rehab Precautions



- Don't wear tight clothing over the radiated area
- Avoid heating pads or ice packs over radiated area
- No rubbing, scrubbing or scratching the sensitive areas
- Use lukewarm water and mild soap
- Avoid powders, creams, perfumes, deodorants, body oils, ointments, lotions, or home remedies not approved by the medical team
- Avoid sun exposure



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Radiation Therapy Precautions

- Permanent brachytherapy specific precautions
 - Avoid pregnant people and children
 - Strain urine to catch any seeds that may have inadvertently passed for the first 7-10 days
 - Wear a condom or dental dam during sexual activity to catch seeds



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Radiation Therapy Side Effects

Short term side effects	Long term side effects
<ul style="list-style-type: none"> -Skin changes (desquamation) -Hair loss -Cancer Related Fatigue -Pelvic pain -Bladder and bowel dysfunction -Sexual dysfunction -Edema -Mucositis -Immunosuppression -Delayed wound healing 	<ul style="list-style-type: none"> -Skin changes -Hair loss -Cancer Related Fatigue -Pelvic pain -Bowel and bladder dysfunction -Sexual dysfunction -Lymphedema -Fibrosis, vaginal or rectal stenosis -Decreased range of motion -Neuropathy, radiation-induced plexopathy -Osteonecrosis -Menopause



Haubner 2012, Burt SM 2023, Stubblefield 2019

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Pelvic Health Rehab Examination

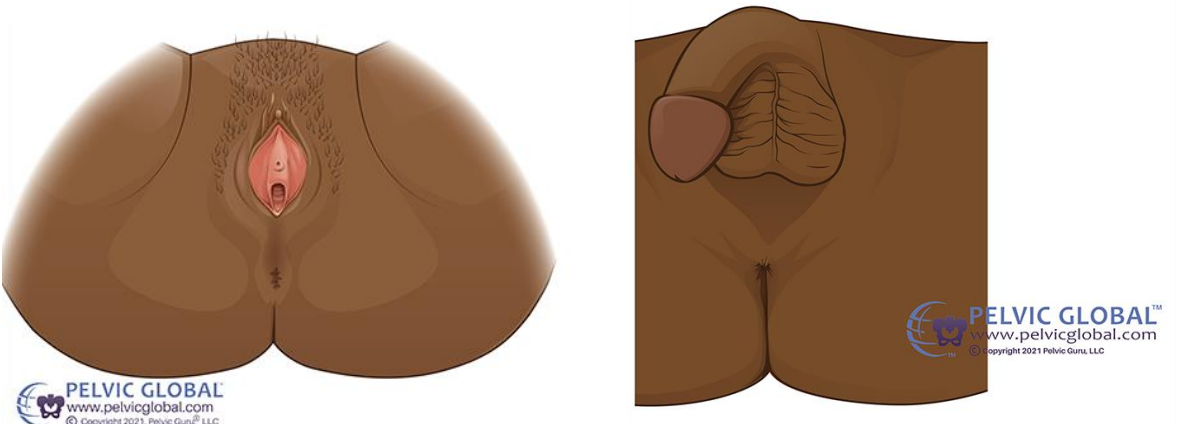


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External Structures



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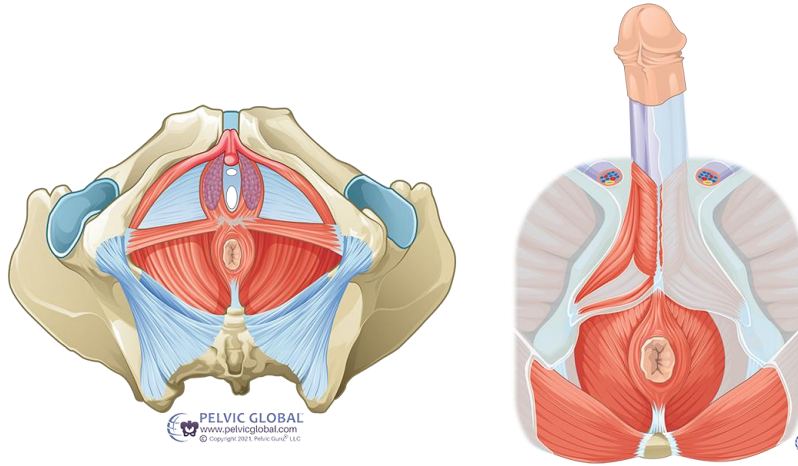


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Superficial Pelvic Floor Muscles (PFM)



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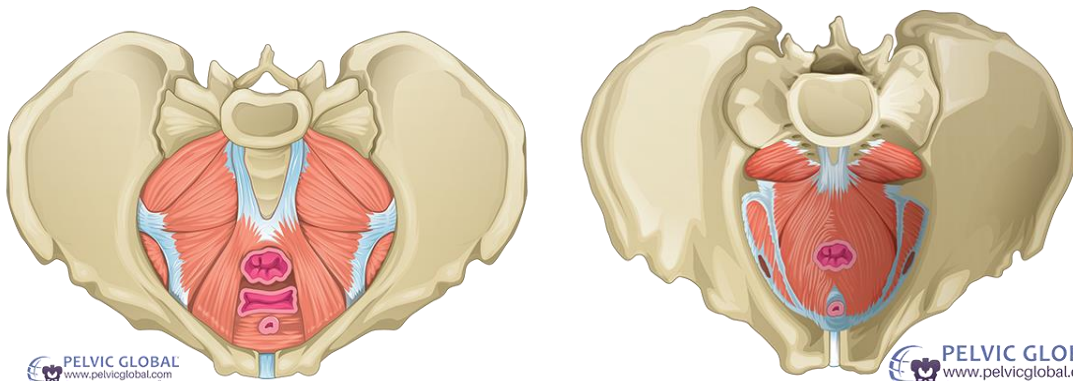
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Deep PFM



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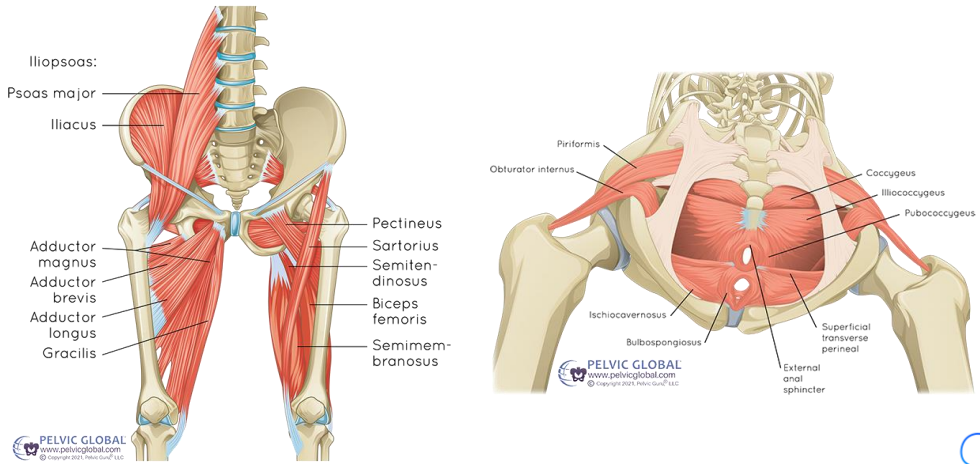
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Surrounding Musculature



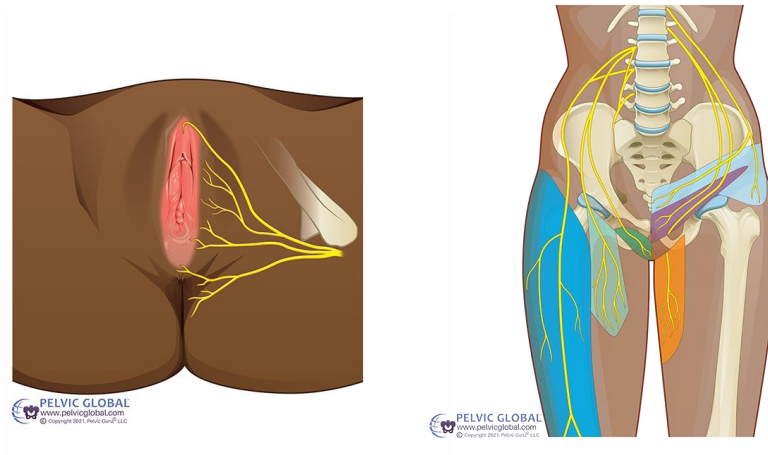
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Pelvic-Related Nerves



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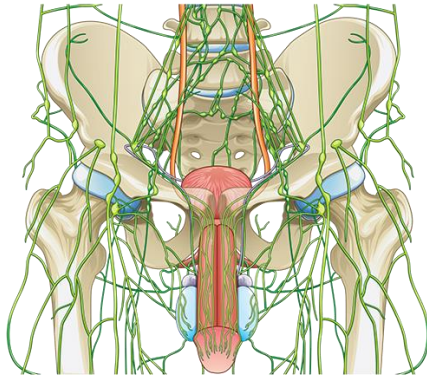


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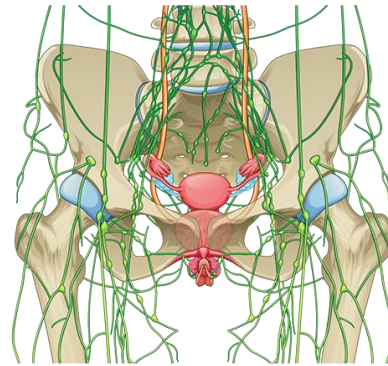


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Pelvic Lymphatics




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Pelvic Cancer-Related Lymphedema Signs and Symptoms

Abdomen

- Heaviness
- Firmness
- Pitting across waistband
- Underwear fitting tighter
- Sensation of bloating
- Skin changes

Genitals/Pelvis

- Genital swelling
- Genital fullness
- Bowel and bladder dysfunction
- Sexual dysfunction
- Skin changes

Legs

- Heaviness, aching
- Numbness, tingling
- Tightness
- Pitting
- Skin changes



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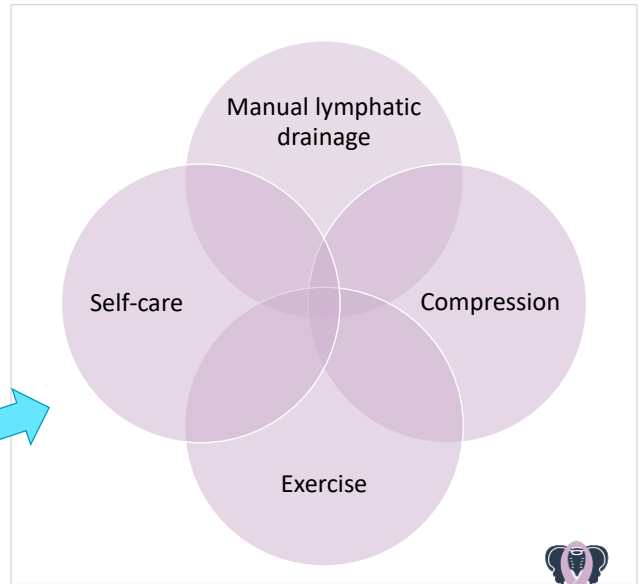


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Lymphedema Management

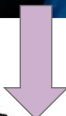
- Screen and monitor
- Refer to Certified Lymphedema Therapist (CLT or CLT-LANA)
- Complete Decongestive Therapy (CDT)



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Vignes 2022



Swell Spot



JoviPak



Tactile Medical



LymphaPress



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Pelvic Health Rehab Interventions



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Patient Education

- Role of rehab before, during, and after treatment
- Implications of tissue changes to pelvic structures → radiation cystitis, proctitis, dyspareunia, anodyspareunia, radiation fibrosis and stenosis
- Warning signs of lymphedema
- Cancer related fatigue
- Skin and tissue care
- Role of dilators
- Bladder and bowel health
- Sexual health



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Pearson 2018, Mhoandas 2017



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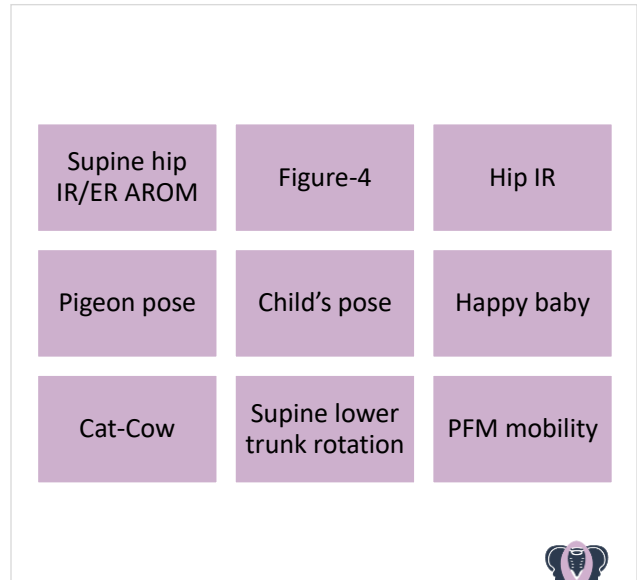
ROM and Mobility Exercises

- Hip rotators and flexors
- Trunk (abdominals!)
- Adductors
- Glutes
- PFM



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Manual Therapy

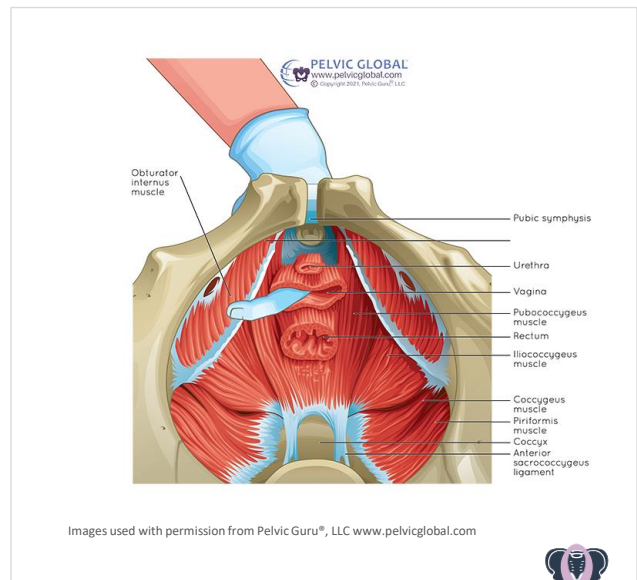
- Soft tissue mobilization
- Fibrosis techniques
- Scar mobilization
- Joint mobilization

Maigne et al 2001, Davia 2014, Trahan et al 2019, Wong et al 2015



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Dilator Training

There is no reliable evidence to show that routine, regular vaginal dilation during or after radiotherapy treatment prevents stenosis or improves quality of life. Some lower-quality studies have found use of dilators prophylactically have lower rates of self-reported stenosis, improved sexual function, and participants are able to tolerate larger dilators.

Damast 2019, Miles 2014, Wallington 2021



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Dilator Training

- Start 2-6 weeks (average of 4 weeks) after radiation therapy has finished
- First month: 3-5 days per week
- Months 2-6: 3 days per week
- After 6 months: use the dilator 2-3 times per week for 36 months to lifelong
- *Penetrative vaginal intercourse can take the place of dilator use*



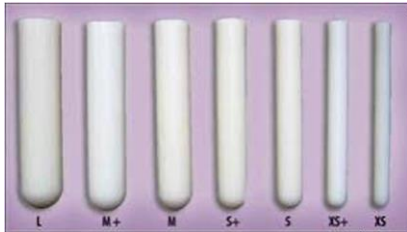
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Summerfield 2020, OncoLink



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Dilator Training



CMT Medical Syracuse dilators



Dr Behrman Dilators



Intimate Rose



Soul Source



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What about rectal dilators?!



Intimate Rose



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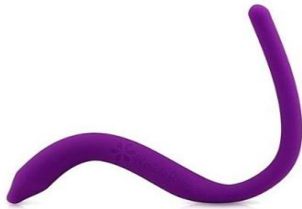


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Pelvic Wands



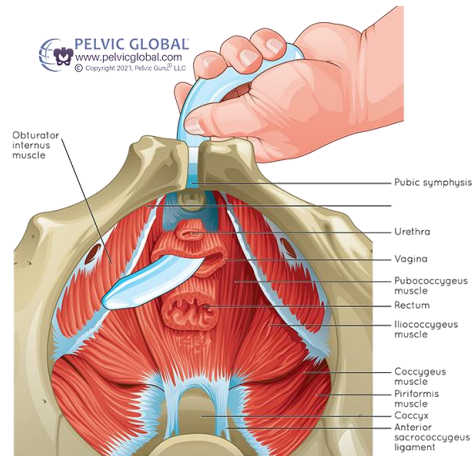
TheraWand



Intimate Rose



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Take Aways for the Clinic


- Be mindful of potential long-term and late side effects after radiation therapy - cellular changes can continue for years!
- Consistent dilator work and mobility exercises performed well beyond the completion of radiation therapy is needed
- If your patient had pelvic radiation, always screen and monitor for pelvic cancer-related lymphedema




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Alex Hill



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Thank you!

Contact: hello@oncopelvicpt.com



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PCOS: Demystifying the Hormonal Web

Dr. Yeni Abraham



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Oluwayeni Abraham



About Me

- Passionate about all things reproductive health and infertility
- Pelvic Educator w/ Triggered Academy
- Fertility Warrior (IVF warrior)
- The Founder of the Pelvic Rehabilitation Fertility Specialist Certification program
- Mom X 2, Wife
- Lover of spicy foods and travel

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Financial Disclosures

I have no financial disclosures.



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Presentation Objectives

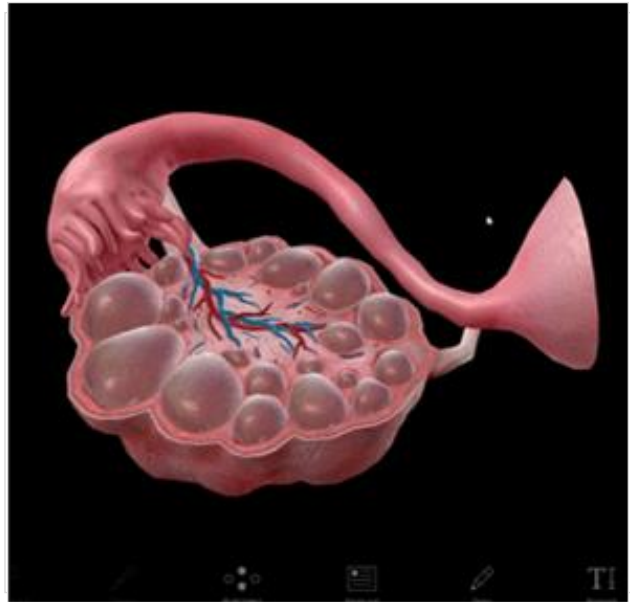
- Overview the Pathophysiology of PCOS
- Recognize the Clinical Presentation of PCOS
- Interpret Lab Findings in PCOS
- Explore the Role of Pelvic Floor Therapists in Treating PCOS
- Identify Common Pelvic Floor-Related Conditions in PCOS Population
- Review Case Studies and Apply Clinical Practice
- Implementing a Multidisciplinary Approach



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Background: Pathophysiology of PCOS

- Polycystic ovary syndrome (PCOS) is considered the most common endocrine disorder amongst reproductive-age women. (Burks & Wild, 2013)
- The prevalence of PCOS is 6.5–8.0% of unselected women of reproductive age. Genetically, PCOS is a common, complex disorder. (Goodarzi & Azziz, 2006)
- No clear gene or genes responsible for this disorder. The PCOS gene(s) remain elusive. (Goodarzi & Azziz, 2006)



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Diagnosing PCOS: Rotterdam Criteria (Smet & McLennan, 2018)

- PCOS is characterized by the presence of excess androgen hormones near the ovaries.
- According to the Rotterdam consensus, polycystic ovarian syndrome (PCOS) is defined by the presence of two of three of the following criteria: oligo-anovulation, hyperandrogenism and polycystic ovaries
- Note→presence of “polycystic ovaries” via imaging is no longer needed for diagnosis.



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PCOS: Rotterdam Criteria (Rao & Bhide, 2020)

1990 NIH guidelines:

Patient satisfies both criteria:

- (1) Clinical or biochemical hyperandrogenism
- (2) Oligomenorrhoea or oligo-ovulation

Other causes of hyperandrogenism and anovulatory subfertility should be excluded.

2003 ESHRE/ASRM or Rotterdam guidelines:

Patient satisfies two of three criteria:

- (1) Oligomenorrhoea or oligo-ovulation
- (2) Clinical or biochemical hyperandrogenism
- (3) Polycystic ovaries on ultrasound

Other causes of hyperandrogenism and anovulatory subfertility should be excluded.

2006 AES guidelines:

Patient satisfies both criteria:

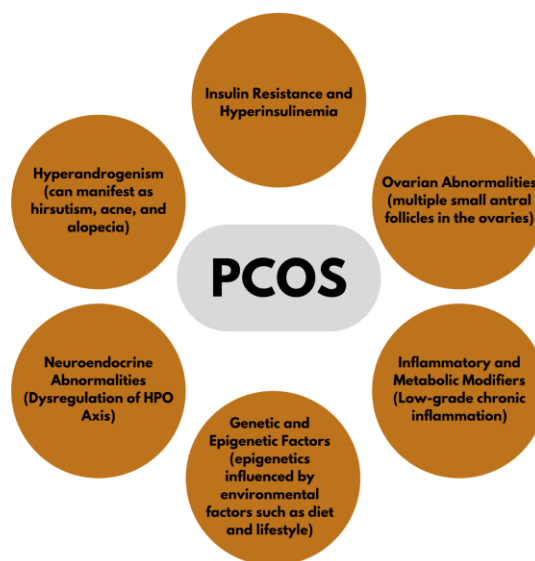
- (1) Hyperandrogenism: hirsutism or biochemical hyperandrogenism
- (2) Ovarian dysfunction: oligo-anovulation or polycystic ovaries

Other causes of hyperandrogenism and anovulatory subfertility should be excluded.

AES, Androgen Excess Society; ASRM, American Society for Reproductive Medicine; ESHRE, European Society for Human Reproduction and Embryology; NIH, National Institute of Health; PCOS, polycystic ovary syndrome.

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PCOS is a complex multifactorial endocrine disorder



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Clinical Presentation of PCOS

Common Symptoms

- Infertility
- Metabolic issues: Obesity, insulin resistance, type 2 diabetes
- Anxiety, depression, body image issues
- Menstrual dysfunction-Waiting 2,3 or more months for periods, Having unexpected periods that are brief or very long
- Abnormal hair growth of face, chin, midline of chest or midline of lower abdomen
- Difficulty with weight gain, including obesity
- Velvety patches of skin along the back of neck or underarms, groin, or under breasts
- Acne (past adolescence, or difficult to treat)
- Thinning of head hair, especially at the upper temples

Associated Conditions

- Cardiovascular risks
- Sleep apnea
- Nonalcoholic fatty liver disease (NAFLD)
- Thyroid Diseases



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Lab Findings in PCOS

Hormonal Assessments

- Elevated luteinizing hormone (LH)
- Increased testosterone levels
- Elevated anti-Müllerian hormone (AMH)

Metabolic Assessments

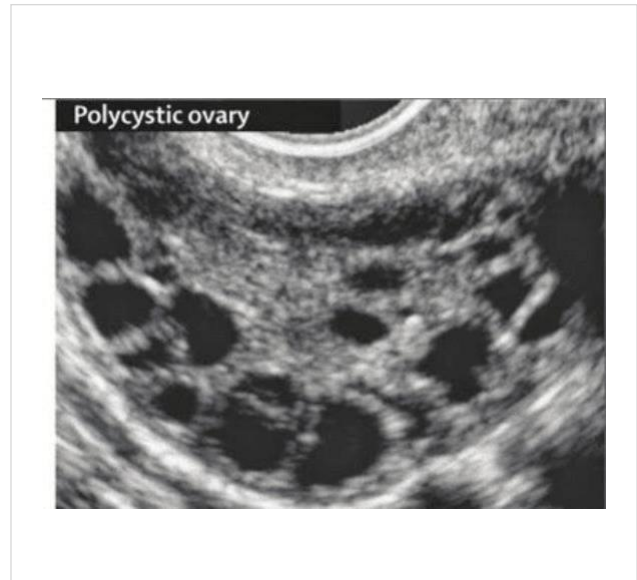
- Fasting glucose and insulin levels
- Lipid profile abnormalities
- Oral glucose tolerance test (OGTT)



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Common Pelvic Floor-Related Conditions in PCOS Population

- Endometriosis
- Urinary Dysfunction
- Bowel Dysfunction



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PCOS & Endometriosis (Horne & Missmer, 2022)

- Despite their distinct pathophysiological mechanisms, emerging research indicates potential overlaps and correlations between the two
- Hormonal and Pathophysiological Overlaps
 - Hormonal Imbalances: These hormonal imbalances can contribute to overlapping symptoms, such as irregular menstrual cycles and pelvic pain.
 - Inflammation and Oxidative Stress: Chronic inflammation and oxidative stress are common in both conditions.



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PCOS and Endometriosis

- Clinical Presentations and Complications
 - Pelvic Pain: Women with PCOS may experience pelvic pain, which is often exacerbated by coexisting conditions such as endometriosis. **The pain can be cyclical or constant and may include dysmenorrhea, dyspareunia, and chronic pelvic pain.** The presence of both conditions can lead to more severe and complex pain syndromes.
 - Fertility Issues: Both PCOS and endometriosis are leading causes of infertility. PCOS interferes with ovulation due to hormonal imbalances, while endometriosis can cause anatomical distortions and inflammatory damage to reproductive organs. Women with both conditions may face compounded fertility challenges and often require assisted reproductive technologies (ART) for conception. (Holoch et al., 2014)
- Diagnostic Challenges
 - Diagnosing the coexistence of PCOS and endometriosis can be challenging due to overlapping symptoms and the need for multiple diagnostic tests.
 - Ultrasound and laparoscopy are commonly used to diagnose endometriosis, while PCOS is diagnosed based on clinical criteria such as the Rotterdam criteria, which include oligomenorrhea, hyperandrogenism, and polycystic ovaries.



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PCOS and Urinary Dysfunction

- Research indicates that women with PCOS are more prone to various urinary disorders, which can significantly affect their quality of life.
- Increased Incidence of Urinary Incontinence:
 - Women with PCOS often exhibit higher rates of urinary incontinence compared to the general population. This can be attributed to several factors, including obesity, insulin resistance, and hyperandrogenism, which are prevalent in PCOS and can weaken pelvic floor muscles, contributing to stress urinary incontinence (SUI).
 - The chronic nature of PCOS, combined with factors like increased abdominal pressure due to obesity, contributes to the weakening of pelvic muscles. This can result in conditions such as pelvic organ prolapse, which further exacerbates urinary symptoms.
 - **Elevated androgen levels can affect the smooth muscle and connective tissue integrity of the bladder and urethra, leading to dysfunctions like incontinence and OAB.** (Guixue et al., 2023)



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PCOS and Urinary Dysfunction

- **Overactive Bladder (OAB):**
 - Some studies have identified a higher prevalence of overactive bladder symptoms in women with PCOS. These symptoms include frequent urination, urgency, and nocturia. The underlying mechanisms are believed to involve chronic low-grade inflammation and hormonal imbalances that affect bladder function. (Uzun et al., 2012)
 - Chronic inflammation associated with PCOS can also contribute to urinary tract issues. Inflammatory cytokines can affect bladder function and increase the sensitivity and responsiveness of the bladder, leading to symptoms of overactive bladder



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PCOS and Bowel Dysfunction (Yurtdaş & Akdevelioğlu, 2019)

- **Gut Microbiota and PCOS**
 - Studies have shown that gut microbiota may be a potential pathogenetic factor in the development of PCOS. Women with PCOS often have alterations in their gut microbiota, known as gut dysbiosis. The imbalance in gut bacteria affects the intestinal mucosal barrier, leading to increased intestinal permeability. This allows endotoxins like lipopolysaccharides to enter the bloodstream, promoting systemic inflammation and exacerbating PCOS symptoms such as hyperandrogenism and insulin resistance
 - Dysbiosis of gut microbiota in women with PCOS appears to be associated with PCOS phenotypes.
 - Studies suggest that insulin resistance, sex hormone concentrations, and obesity may affect the diversity and composition of gut microbiota in women with PCOS.
 - With better understanding of the role of intestinal microbiota in PCOS, interventions including prebiotics, probiotics, and synbiotics can be considered as future treatment options.



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PCOS and Bowel Dysfunction Symptoms

- Women with PCOS may experience symptoms of bowel dysfunction, including:
 - Irritable Bowel Syndrome (IBS): PCOS is linked to a higher prevalence of IBS, characterized by symptoms such as abdominal pain, bloating, and altered bowel habits (diarrhea or constipation). The chronic inflammation and hormonal imbalances in PCOS can contribute to these symptoms.
 - Constipation: Hormonal imbalances, particularly elevated androgens and insulin resistance, can slow gastrointestinal motility, leading to constipation.
 - Abdominal Pain and Bloating: Chronic low-grade inflammation and gut dysbiosis in PCOS patients can cause abdominal discomfort and bloating.



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The Role of PFT in the Treatment of PCOS

- Pelvic floor therapists play a crucial role in the comprehensive management of Polycystic Ovary Syndrome
- Pelvic floor therapists are integral to the multidisciplinary approach required for effective PCOS management. Their role in addressing pelvic pain, urinary and bowel dysfunction, sexual health, weight management, and mental well-being significantly improves the quality of life for women with PCOS.
- Lifestyle Modifications: Weight management, regular exercise, and dietary changes are crucial in managing both conditions. These interventions can help reduce inflammation, improve hormonal balance, and alleviate symptoms.



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Clinical Practice: Case Study of PCOS (#1)

Clinical Presentation

- 31 yo hispanic woman with PCOS presents with chronic pelvic pain, irregular menstrual cycles, and urinary urgency.
- Urethral sensitivity and facial tightness
- Chronic bloating, palpable groin lymph nodes, sensitive bladder
- Restrictive bladder & uterine mobility via visceral assessment

Treatment Approach

- Manual Techniques: myofascial release around urethra, lymphatic drainage, visceral manipulation
- Habitual/Lifestyle changes: Bladder diary
- Functional Nutrition: The patient received a tailored nutrition plan aimed at balancing blood sugar levels and reducing inflammation. This included a diet rich in anti-inflammatory foods and omega-3 fatty acids. The patient also incorporated high-fiber foods to support gut health.
- **Outcome:** After 5 months of treatment, the patient reported significant improvements in pelvic pain, return of menstrual cycles (36-37 days) and reduced urinary urgency. She also experienced an overall improvement in quality of life and well-being.



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Clinical Practice: Case Study of PCOS (#2)

Clinical Presentation

- A 27-year-old woman with a long-standing history of Polycystic Ovary Syndrome (PCOS) presented with severe chronic pelvic pain and gastrointestinal symptoms including constipation and bloating. She also reported significant weight gain and irregular menstrual cycles, which had exacerbated her symptoms. The patient had been through multiple unsuccessful treatment modalities, including hormonal therapies and pain management medications.

Treatment Approach

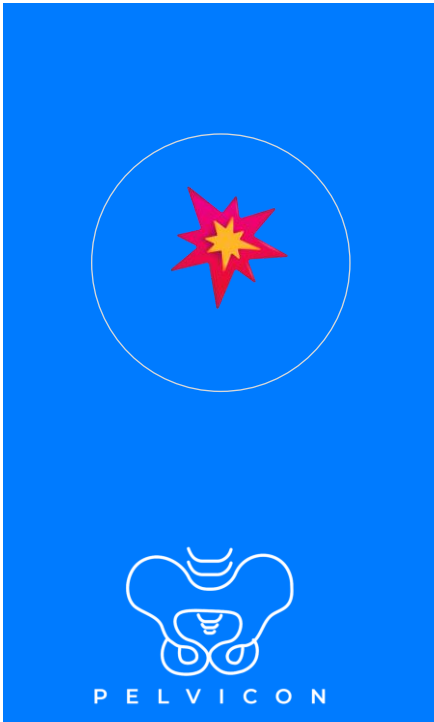
- Functional Nutrition: Anti-inflammatory Diet, Gut Health Optimization: Probiotics and high-fiber foods were included to improve gut health and alleviate constipation.
- Lifestyle Modifications– GLPs to promote weight loss, Low impact resistance training, Stress Reduction– prayer, orgasms Sleep Hygiene: The patient received guidance on improving sleep quality, which is crucial for hormonal balance and overall health.
- Medical Management (referred to endocrinologist) - Metformin: Prescribed to help manage insulin resistance and support weight loss efforts.

Outcome

- 6 months of treatment=The patient reported a significant reduction in pelvic pain, with fewer and less severe flare-ups.
- Periods became regular at 29 days
- Weight and Metabolic Health: The patient experienced a gradual weight loss of 10% of her body weight, leading to improved insulin sensitivity and more regular menstrual cycles.



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Participant Takeaways/Challenge

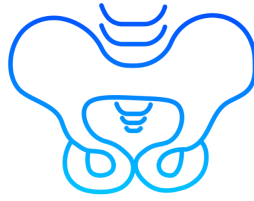
1. Look at your intake paperwork: does it allow/encourage a place gynecological or menses health, what about weight or quality of life?
2. Look at your subjective interview: do you feel comfortable discussing irregular periods and hormone health?
3. I challenge you to ask one patient each day about hormone health.



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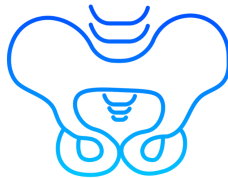
Q&A



P E L V I C O N

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Giveaway!



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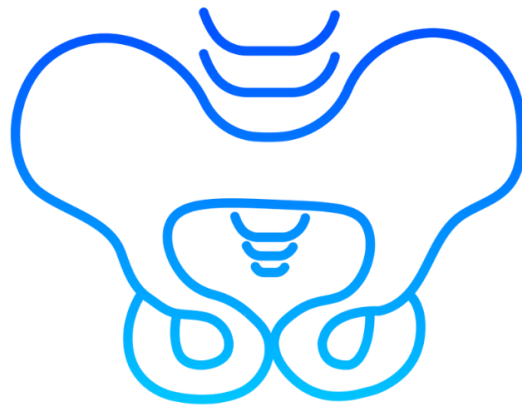
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Close Out Dinner

(Sat, 9/28 @ 7pm)



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P E L V I C O N

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Pelvic Floor Dysfunction & Lower Back Pain: A Tale of an Unexpected Relationship

Sinéad Dufour, PT PhD



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Sinéad Dufour



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About Me

- **Academic Clinician**
- **Consulting Expert**
- **Clinical Educator**
- **Student**
- **Mother**
- **Advocate**



Presentation Outline

- Establishing Context
 - lower back pain (LBP)
 - lumbopelvic pain (LPP)
 - pelvic floor dysfunction (PFD)
- Association LPP & PFD
 - previous perspective
 - evolving perspective
- Clinical application
 - fit for purpose model
 - lifestyle intervention framework



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Lower back pain

- an experience
 - pain is a symptom
 - LBP is an experience
- rarely structural in nature
 - Lancet series 2018
- multifaceted
 - psychophysiological
 - social & spiritual
- the number one reason people seek care
- increasing from a global burden perspective

Projected global prevalence of lower back pain by 2050:



843
MILLION
PATIENTS



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Review > Lancet. 2018 Jun 9;391(10137):2356-2367. doi: 10.1016/S0140-6736(18)30480-X. Epub 2018 Mar 21.

What low back pain is and why we need to pay attention

Jan Hartvigsen¹, Mark J Hancock², Alice Kongsted¹, Quinette Louw³, Manuela L Ferreira⁴, Stéphane Genevay⁵, Damian Hoy⁶, Jaro Karppinen⁷, Glenn Pransky⁸, Joachim Sieper⁹, Rob J Smeets¹⁰, Martin Underwood¹¹, Lancet Low Back Pain Series Working Group

Review > Lancet. 2018 Jun 9;391(10137):2368-2383. doi: 10.1016/S0140-6736(18)30489-6. Epub 2018 Mar 21.

Prevention and treatment of low back pain: evidence, challenges, and promising directions

Nadine E Foster¹, Johannes R Anema², Dan Cherkin³, Roger Chou⁴, Steven P Cohen⁵, Douglas P Gross⁶, Paulo H Ferreira⁷, Julie M Fritz⁸, Bart W Koes⁹, Wilco Peul¹⁰, Judith A Turner¹¹, Chris G Maher¹², Lancet Low Back Pain Series Working Group

> Lancet. 2018 Jun 9;391(10137):2384-2388. doi: 10.1016/S0140-6736(18)30488-4. Epub 2018 Mar 21.

Low back pain: a call for action

Rachelle Buchbinder¹, Maurits van Tulder², Birgitta Öberg³, Lucíola Menezes Costa⁴, Anthony Woolf⁵, Mark Schoene⁶, Peter Croft⁷, Lancet Low Back Pain Series Working Group

LANCET LBP SERIES



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THERE ARE MANY MYTHS, MISUNDERSTANDINGS AND UNNECESSARY FEARS ABOUT PAIN. MOST PEOPLE, INCLUDING MANY HEALTH PROFESSIONALS, DO NOT HAVE A MODERN UNDERSTANDING OF PAIN.

David Butler, B Phyt, GDAMT, M App Sc, PT and Lorimer Moseley, PhD, FACP
Explain Pain



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BACK FACTS

- Persistent back pain can be scary, but it's rarely dangerous**
Persistent back pain can be distressing and disabling, but it's rarely life-threatening and you are very unlikely to end up in a wheelchair.
- Getting older is not a cause of back pain**
Although it is a widespread belief and concern that getting older causes or worsens back pain, research does not support this, and evidence-based treatments can help at any age.
- Persistent back pain is rarely associated with serious tissue damage**
Backs are strong. If you have had an injury, tissue healing occurs within three months, so if pain persists past this time, it usually means there are other contributing factors. A lot of back pain begins with no injury or with simple, everyday movement. These occasions may relate to stress, tension, fatigue, inactivity or unaccustomed activity which make the back sensitive to movement and loading.
- Scans rarely show the cause of back pain**
Scans are only helpful in a minority of people. Lots of scary-sounding things can be reported on scans such as disc bulges, degeneration, protrusions, arthritides, etc. Unfortunately, the reports don't say that these findings are very common in people without back pain and that they don't predict how much pain you feel or how disabled you are. Scans can also change, and most disc protrusions shrink over time.
- Pain with exercise and movement doesn't mean you are doing harm**
When pain persists, it's common that the spine and surrounding muscles become really sensitive to touch and movement. The pain you feel during movement and activities reflects how sensitive your structures are – not how damaged you are. So it's safe and normal to feel some pain when you start to move and exercise. This usually settles down with time as you get more active. In fact, exercise and movement are one of the most effective ways to help treat back pain.
- Back pain is not caused by poor posture**
How we sit, stand and bend does not cause back pain even though these activities may be painful. A variety of postures are healthy for the back. It is safe to relax during everyday tasks such as sitting, bending and lifting with a round back – in fact, it's more efficient!
- Back pain is not caused by a 'weak core'**
Weak 'core' muscles do not cause back pain. In fact people with back pain often tense their 'core' muscles as a protective response. This is like clenching your fist after you've sprained your wrist. Being strong is important when you need the muscles to switch on, but being tense all the time isn't helpful. Learning to relax the 'core' muscles during everyday tasks can be helpful.
- Backs do not wear out with everyday loading and bending**
The same way lifting weights makes muscles stronger, moving and loading make the back stronger and healthier. So activities, like running, twisting, bending and lifting, are safe if you start gradually and practice regularly.
- Pain flare-ups don't mean you are damaging yourself**
While pain flare-ups can be very painful and scary, they are not usually related to tissue damage. The common triggers are things like poor sleep, stress, tension, worries, low mood, inactivity or unaccustomed activity. Controlling these factors can help prevent exacerbations, and if you have a pain flare-up, instead of treating it like an injury, try to stay calm, relax and keep moving!
- Injections, surgery and strong drugs usually aren't a cure**
Spine injections, surgery and strong drugs like opioids aren't very effective for persistent back pain in the long term. They come with risks and can have unhelpful side effects. Finding low-risk ways to put you in control of your pain is the key.

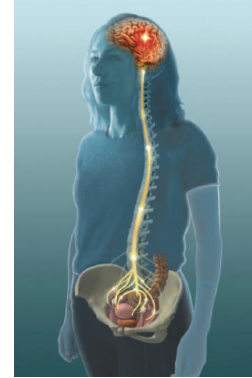




This infographic is a summary only. Please consult the full text for information and supporting references. © Sullivan P, Canahon J, Liu J, Russell S, Wernli A, Ozkavutlu M. Back to Basics: 10 facts about the back pain. BJSM, 2019.

Lumbopelvic pain

- an umbrella term that encompasses
 - LBP & PGP
- an experience
 - pain is a symptom
 - LPP is an experience - a prevalent one!
 - labelling according to location is unhelpful
- rarely structural in nature
 - Beales et al, 2020 & Palsson et al, 2019
- common in pregnancy and postpartum
 - incorrectly linked to pregnancy



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Musculoskeletal Science and Practice 48 (2020) 102152

Contents lists available at ScienceDirect



Musculoskeletal Science and Practice

journal homepage: www.elsevier.com/locate/msksp

Professional issue

Understanding and managing pelvic girdle pain from a person-centred biopsychosocial perspective

Darren Beales^{a,*}, Helen Slater^a, Thorvaldur Palsson^b, Peter O'Sullivan^a



1. 'Making sense of pain': This process helps the patient build a person-centred biopsychosocial understanding of their pain, dispel unhelpful pain myths and identify clear goals towards self-management.
2. 'Exposure with control': This is a process of behavioral learning where the patient is gradually exposed and returned to pain provocative, feared and avoided but valued activities with pain control and confidence. During this process, protective muscle guarding and movement avoidance is actively discouraged by incorporating diaphragmatic breathing and body relaxation techniques. Muscle conditioning may also be incorporated into this process as functional restoration occurs. This learning is generalized and gradually integrated into valued activities of daily living.
3. 'Lifestyle change': This is a process whereby the patient is encouraged to engage in regular physical activity of their preference, develop healthy sleep and dietary habits where indicated.

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EDITOR'S CHOICE

Changing the Narrative in Diagnosis and Management of Pain in the Sacroiliac Joint Area

Thorvaldur S Pálsson, William Gibson, Ben Darlow, Samantha Bunzli, Gregory Lehman ...

Physical Therapy, Volume 99, Issue 11, November 2019, Pages 1511–1519, <https://doi-org.libaccess.lib.mcmaster.ca/10.1093/ptj/pzz108>



- **Pain** is contingent on identifying individual's **sense of threat**
 - nociceptive input from SIJ area tissues **may** contribute to threat perception.
 - cognitions (**FEAR**) appear to be **highly relevant** in to motor planning changes that characterize pain in the SIJ area.
- Explain how pain works tailored to the individual presentation – key!
- Promote reassurance regarding structural integrity of the pelvis



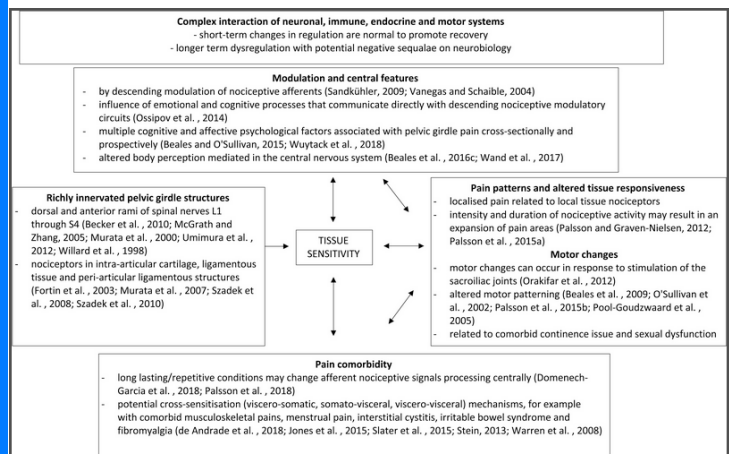
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Pelvic Girdle Pain

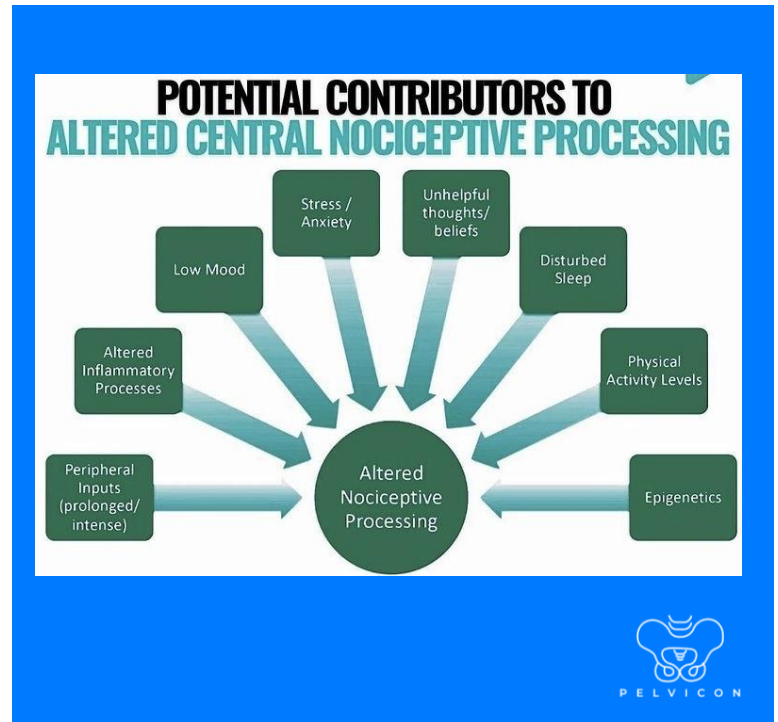
- How relevant is structure?
- How relevant are pain provocation tests?
- How relevant it is to attempt to tease it apart from lower back pain?



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Why is my pelvis so sensitive?



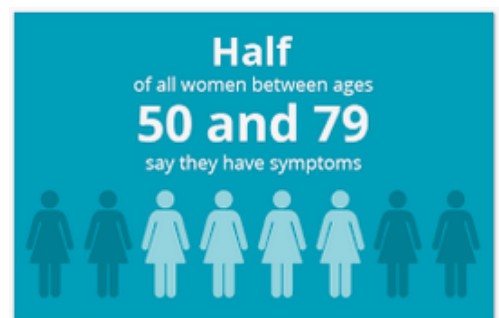
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Pelvic Floor Dysfunction

- An umbrella term
- Describes various symptoms and conditions that are characterized by the pelvic floor and associated connective tissue not optimally functioning



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Pelvic Floor Dysfunction

- **Urinary incontinence***
- Fecal incontinence
- Functional constipation
- **Pelvic organ prolapse***
- Pelvic pain
 - Dyspareunia
 - Vaginismus
 - Painful periods
 - Painful bladder syndrome



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What is the association between LPP and PFD?



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We once thought...

- Association between PFD & LBP to be anatomical
 - Local connection of lumbopelvic tissues
 - Relationship of muscles via canister system (theory)
- Association between PDF & LBP - causation
 - The presence of PFD to be the cause of LBP
 - weak PFM dichotomized from tight PFM
 - both states of PFM "cause" LBP - be be the "missing link"
 - **particularly weak PFM → "lack of stability" and thus LBP**
- Addressing the PFM directly - key to comprehensive LBP care
 - All relevant care providers need to be aware of the association



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Contents lists available at [ScienceDirect](#)

Musculoskeletal Science and Practice

journal homepage: www.elsevier.com/locate/mksp



Original article

Association between lumbopelvic pain and pelvic floor dysfunction in women: A cross sectional study

Sinéad Dufour, PT PhD^{a,*}, Brittany Vandyken, MScPT^a, Marie-Jose Forget, BScPT^b, Carolyn Vandyken, BScPT^b

^a McMaster University, School of Rehabilitation Science, Hamilton, Ontario, Canada

^b Pelvic Health Solutions, Cambridge, Ontario, Canada



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What did we do? (Dufour et al, 2018)

- Build on the established “link” between PFD and LBP yet to be elucidated
 - preceding studies all self-report measures*
 - empower clinicians **without** internal skills to improve clinical reasoning
- Blinded cross-sectional study (3 domains of assessment)
- Target – adult females with LBP (not PFD)
- Almost 200 participants recruited
 - High exclusion rate*
 - Final sample n=85



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What did we find? (Dufour et al, 2018)

- Almost 84% of sample had reported PFD symptoms
- Over 95% of sample had a positive physical finding of PFD
 - **weak vs tight PFM dichotomy flawed**
 - **majority** of participants had **TOP** (protective PFM) & **weak PFM**
 - palpation based assessments used – limitations*
- Tenderness on palpation (TOP) - most pervasive physical finding
 - 100% of pregnant participants = TOP (sub-analysis)
- Urinary incontinence most pervasive self-reported issue



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Table 4
Summary of Results.

Characteristics	All (N = 85)	LBP (N = 56)	PGP (N = 9)	Combined ^a (N = 17)	Non-specific pain (N = 3)	Fisher's Exact Test P-value
Mean Age (SD)	43.4(13.8)	41.6(12.5)	43.7(13.7)	47.9(17.7)	52.0(7.5)	NT
Oswestry Disability Index (%)						NT
Minimal Disability	41.2	46.4	55.6	17.6	33.3	NT
Moderate Disability	44.7	44.6	33.3	47.1	66.7	NT
Severe Disability	12.9	8.9	11.1	29.4	0	NT
Crippled Disability	1.0	0	0	5.9	0	NT
Urinary Incontinence (%)	62.4	57.1	66.7	76.5	66.7	0.54
Fecal Incontinence (%)	3.6	3.6	11.1	11.8	0	0.35
Chronic Constipation (%)	25.9	23.3	55.6	17.6	33.3	0.15
Pelvic Pain (%)	50.6	44.6	55.6	64.7	66.7	0.78
Dyspareunia (%)	77.0	44.6	55.6	52.9	33.3	0.86
Overall Subjective PFD (%)	83.5	82.1	100	94.1	100	0.47
Pelvic Organ Prolapse (%)	33.9	33.9	44.4	64.7	33.3	0.14
Pelvic Floor Tenderness (%)	70.6	83.9	66.7	88.2	66.7	0.36
Pelvic Floor Weakness (%)	66.5	58.9	66.7	88.2	66.7	0.12
Positive Forced FABERs (%)	62.4	51.8	88.9	94.1	0	< 0.001
Positive Forced FABERs + Pelvic Floor Tenderness (%)	55.5	51.8	55.6	82.4	0	0.77
Overall Objective PFD (%)	95.3	92.8	100	100	100	0.57



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What did we learn? (Dufour et al, 2018)

- LBP & PFD highly prevalent
 - two prevalent co-existing issues or co-related?
- PFM weakness is not a stand-alone characteristic
 - assuming the targeting of "weak" core in LBP flawed
 - Dichotomizing tight vs weak PF flawed
- Pain catastrophizing – **huge** in standard presentation of LBP
 - TOP appeared to be the most important "link"
 - study missed important multi-system assessment
 - central pain mechanisms require further exploration
- Many people with LBP not interested in digital PFM exam
 - multiple ways of garnering insight on PFM state needed



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EDITOR'S CHOICE

Predictors of Pelvic Floor Muscle Dysfunction Among Women With Lumbopelvic Pain

Alexandra Keizer, Brittany Vandyken, Carolyn Vandyken, Darryl Yardley, Luciana Macedo, Ayse Kuspinar, Nelly Fagahani, M-J Forget, Sinéad Dufour

Physical Therapy, Volume 99, Issue 12, December 2019, Pages 1703–1711, <https://doi-org.libaccess.lib.mcmaster.ca/10.1093/ptj/pzz124>



Brazilian Journal of Physical Therapy
Volume 25, Issue 3, May–June 2021, Pages 256–261



Original Research

Pelvic floor muscle tenderness on digital palpation among women: convergent validity with central sensitization

Brittany Vandyken^b, Alexandra Keizer^a, Carolyn Vandyken^b, Luciana G. Macedo^a, Ayse Kuspinar^a, Sinéad Dufour^a,   



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Additional Insights (Keizer et al, 2019¹ & Vandyken et al, 2020²)

- Aim -validate potential screening questions or non-internal assessment techniques to predict PFD¹
 - N=108 (women with LPP)
 - confirmed that self-report did align with PFF (non-specific)
- Two items did predicted tenderness on palpation (TOP)
 - Self-reported urinary urgency
 - CSI score of >40
- Aim - determine convergent validity between CSI score >40 and TOP²
- Convergent validity confirmed
 - **Central mechanisms are important to explore and assess**



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LLP and PFD coexist

TOP appears to represent the most important "missing link" or co-relation (central factor)



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Review > Sex Med Rev. 2021 Jan;9(1):64-75. doi: 10.1016/j.sxmr.2020.02.002.
Epub 2020 Mar 29.

"The Overactive Pelvic Floor (OPF) and Sexual Dysfunction" Part 1: Pathophysiology of OPF and Its Impact on the Sexual Response

Anna Padoa ¹, Linda McLean ², Melanie Morin ³, Carolyn Vandyken ⁴

Review > Int Urogynecol J. 2021 Mar;32(3):501-552. doi: 10.1007/s00192-020-04622-9.
Epub 2021 Jan 8.

The pathophysiology of stress urinary incontinence: a systematic review and meta-analysis

Kobra Falah-Hassani ¹, Joanna Reeves ¹, Rahman Shiri ², Duane Hickling ³ ⁴, Linda McLean ⁵

> Int Urogynecol J. 2024 Jan;35(1):227-236. doi: 10.1007/s00192-023-05697-w.
Epub 2024 Jan 2.

Central Sensitisation Syndrome: A Frequent Finding in Women with Pelvic Floor Symptoms Without Evident Urogenital Prolapse

Carolien K M Vermeulen ¹ ² ³, Willemijn Tunnissen ⁴, Anne-Lotte W M Coolen ⁵,
Joggem Veen ⁴, Viviane Dietz ⁶, Sanne A L van Leijssen ⁴, Marlies Y Bongers ⁴ ⁷

PATHOPHYSIOLOGY OF PFD

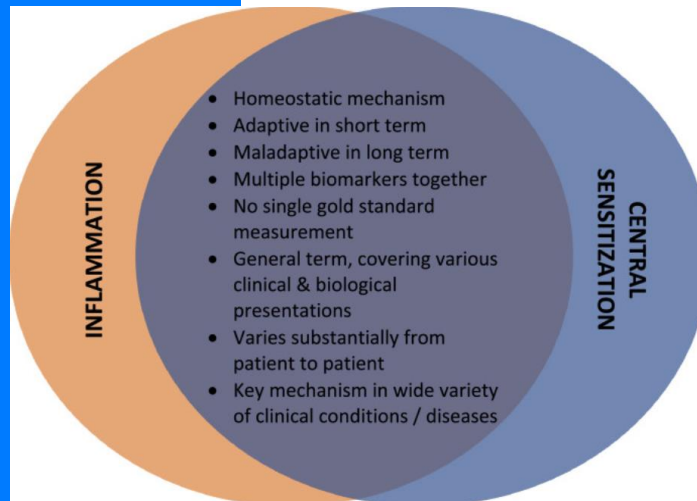


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Editorial > Braz J Phys Ther. 2023 May-Jun;27(3):100518. doi: 10.1016/j.bjpt.2023.100518. Epub 2023 Jun 14.

Nociplastic pain and central sensitization in patients with chronic pain conditions: a terminology update for clinicians

Jo Nijs¹, Anneleen Malfliet², Tomohiko Nishigami³



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EDITORIAL

A paradigm shift from a tissue- and disease-based approach towards multimodal lifestyle interventions for chronic pain: 5 steps to guide clinical reasoning

1: Identify the relevant lifestyle factors

2: Identify and tackle barriers for a behavioral lifestyle change

3: Design the individually tailored, stepped-care, multimodal lifestyle intervention together with your patient

4: Apply the multimodal lifestyle intervention through continuous enhancing of the patient's motivation and adaptation of the program

5: Facilitate long-term adherence

Fig. 1 Five key consecutive steps in the clinical reasoning process when applying an individually-tailored multimodal lifestyle intervention for patients with chronic pain.

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A multimodal intervention aimed at changing lifestyle-encompassing cognitive, behavioral and physical aspects appears to be the most effective in improving pain intensity and functional disability caused by LBP.



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Review > Healthcare (Basel). 2024 Feb 20;12(5):505. doi: 10.3390/healthcare12050505.

Effects of Lifestyle Interventions on the Improvement of Chronic Non-Specific Low Back Pain: A Systematic Review and Network Meta-Analysis

Pablo Herrero ^{1, 2}, Paula Val ¹, Diego Lapuente-Hernández ^{1, 2}, Juan Nicolás Cuenca-Zaldívar ^{3, 4, 5}, Sandra Calvo ^{1, 2}, Eva María Gómez-Trullén ^{1, 2}

Academic Editor: ...

Reframing beliefs and instilling facts for contemporary management of pregnancy-related pelvic girdle pain

Jodie Pulsifer ¹, Susannah Britnell ¹, Adrienne Sim ², Jessica Adaszynski ³, Sinead Dufour ⁴

REFRAMING BELIEFS ABOUT PREGNANCY-RELATED PELVIC GIRDLE PAIN
 Authors: J. Pulsifer, S. Britnell, A. Sim, J. Adaszynski, S. Dufour

- STABLE**: This pelvic is resilient and adaptable to the demands of pregnancy, childbirth and childcare while maintaining its stable structure.
- SAFE**: Postural and pelvic structural changes are normal, safe and necessary to support the growing demands of pregnancy and childcare.
- SELF MANAGEABLE**: With education, individualized self-management, exercise and manual resources that promote independence are the most helpful strategies to reduce pregnancy-related pelvic girdle pain.

THE STRONGEST PREDICTOR OF RESOLUTION OF PREGNANCY-RELATED PELVIC GIRDLE PAIN (PPGP) IS HAVING THE BELIEF THAT IT WILL GO AWAY

FACTS TO HELP REFRAME BELIEFS ABOUT PREGNANCY-RELATED PELVIC GIRDLE PAIN
 Authors: J. Pulsifer, S. Britnell, A. Sim, J. Adaszynski, S. Dufour

- STABLE**
 - HORMONES**: All pregnant people have hormonal changes to accommodate the demands of pregnancy, which alter tissue sensitivity, flexibility, and systemic inflammatory processes in the body. It is helpful for people with PPGP to understand that hormones can create increased sensations and flexibility but the pelvis remains robust throughout pregnancy.
 - JOINT CHANGES**: There is no current evidence correlating relaxin levels and PPGP. The pregnant pelvis has normal changes to increase fit and width of the pubic symphysis and sacrospinous joints. People with PPGP should be reassured that these changes are healthy and adaptive for pregnancy and birth.
 - VARIED MOVEMENTS**: Misguided beliefs about lack of pelvic stability and the need to keep the core contracted and legs together can lead to muscle guarding, increased sensitivity, and fear of movement. People with PPGP should be reassured it is safe and beneficial to move in novel and diverse ways that are comfortable to them.
- SAFE**
 - POSTURE ADAPTATIONS**: Posture and postural changes in pregnancy do not coincide with pain intensity or the development of PPGP. People with PPGP should be reassured that postural adaptations in pregnancy are healthy, necessary and normal.
 - LACTATION**: Lactation does not worsen or prolong PPGP and has been proposed to have a global anti-inflammatory protective effect. People who wish to chestfeed, breastfeed or pump should be encouraged to do so without fear of worsening or prolonging PPGP.
 - VAGINAL BIRTH**: Vaginal births have a lower risk of severity and persistence of PPGP. Education regarding the safety and benefits of vaginal birth as well as support to reduce associated fears should be primary interventions for people with PPGP.
- SELF MANAGEABLE**
 - LIFESTYLE AND EDUCATION**: PPGP is influenced by the stress response system, emotional wellbeing and sleep. Pain can be improved through individualized pain education, lifestyle counseling and daily living movement strategies that empower people with PPGP to self-manage. (Beliefs, Stress, Sleep)
 - PHYSICAL ACTIVITY**: Exercise has been shown to help reduce PPGP in pregnancy and to prevent PPGP if started prior to pregnancy. Pregnant people should be encouraged to obtain the minimum recommended activity in pregnancy for maternal and fetal health benefits, and to prevent and reduce PPGP.
 - EXTERNAL SUPPORTS**: Belts and manual therapies can be used to create sensory-motor changes through novel proprioceptive input that promotes confidence and safety in movement. People with PPGP should be advised that primary intervention should emphasize behaviour change that empower self-management.

PREGNANCY-RELATED PELVIC GIRDLE PAIN IS CHANGEABLE
 For original supporting references, please consult the full text article.

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Lifestyle is



Prevention

Based on the secondary analysis of a large RCT, a dietary intervention with high fruit, vegetable, and whole grain content as well as a moderate caloric intake can be recommended to postmenopausal women to prevent UI. **(Grade of recommendation: B New)**

Based on one longitudinal study, higher levels of physical activity (≥ 43.2 MET hours/week) could be recommended to continent parous middle-aged women. **(Grade of recommendation: C New)**

Treatment:

Behavioral weight loss should be recommended to obese and overweight women with UI. **(Grade of recommendation: A)**

A physical activity programme for the reduction of abdominal fat could be recommended to young overweight women with UUI to reduce LUTS **(Grade of recommendation: C New)**

A low-fat and high-fruit, vegetable and whole grain diet could be recommended as it has a small effect in decreasing UI symptoms independently of weight change, age, ethnicity, and hormone replacement use. **(Grade of recommendation: C New)**

Vitamin D supplementation can be recommended to decrease UUI episodes in post-menopausal women in women of certain ethnicity. **(Grade of recommendation: B)**

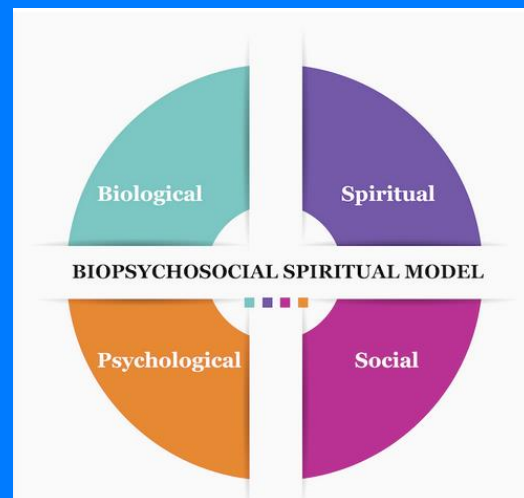
An adequate fluid intake and the reduction of caffeine consumption can be recommended for people with UI and related LUTS symptoms. **(Grade of recommendation: B)**



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metaphysics of the pelvis

- houses the foundation for spiritual development
- issues of family
- sense of belonging
- worthiness
- self-acceptance



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Upstream influences on the tissue of pelvis seem to be important



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We now know...

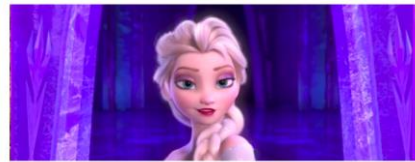
- LPP - requires a bio-psycho-social spiritual approach
 - psychophysiological > biomechanical or tissue-based
 - tissue tension and aberrant movement patterns - downstream
- Protective PFM state (TOP), most common presentation with co-existing lower back pain
 - fear a key cause of PFM protection and linked to LPP
 - tension in the PFM linked to UI and constipation
 - High CSI linked to PFD
 - fear and catastrophizing also linked to POP symptoms
 - fear connected to reducing (or stopping) exercise
 - exercise protective for LPP and PFD
 - lifestyle is queen!
- PFD - requires a bio-psycho-social spiritual approach



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Psychologically Informed Care

- born out of the lack of efficacy of biomedical approaches to LBP
- from this, the lens of trauma informed-care was born
- this lens is key when considering PFD - particularly PFM protection



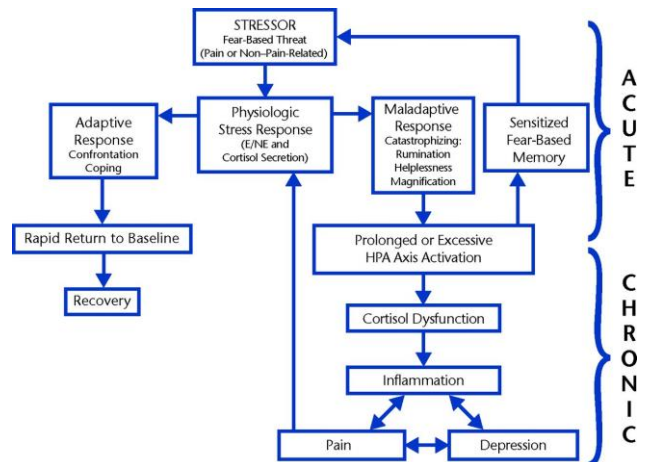
Antony Lo 12 Aug 2018
About Antony, Information For Therapists, Our Philosophy, Posture

The Postural Structural Biomechanical (PSB) Model – It's Time To Let It Go!

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Physiotherapy is about the restoration of thoughtless, fearless movement

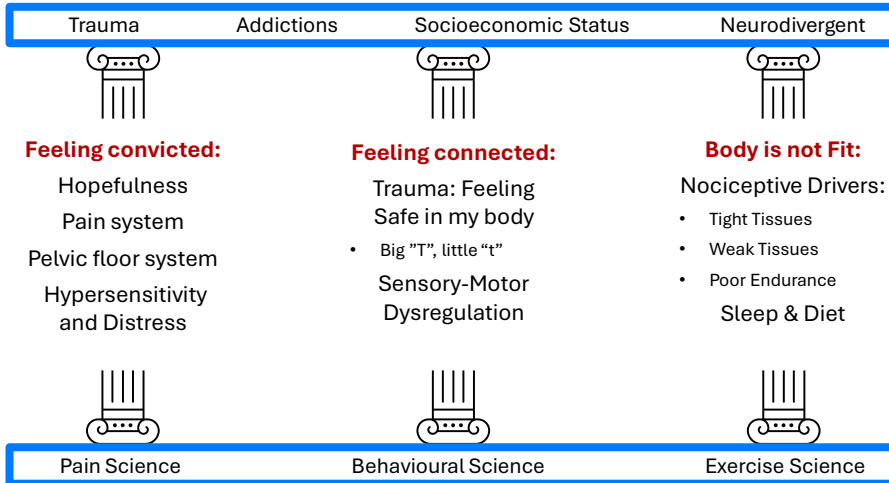
-Louie Gifford



Physical Therapy, Volume 94, Issue 12, 1 December 2014,
Pages 1816–1825, <https://doi.org/10.2522/ptj.20130597>


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Fit-for-Purpose: LPP & PFD (Ben Wand)



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PRISM—Pain Recovery and Integrative Systems Model: A Process-Based Cognitive-Behavioral Approach for Physical Therapy

Joe Tatta , PT, DPT^{1,2,*}, Rose M. Pignataro, PT, DPT, PhD, CWS, CHES³, Janet R. Bezner, PT, DPT, PhD, FAPTA⁴, Steven Z. George, PT, PhD, FAPTA^{5,6}, Carey E. Rothschild, PT, DPT, OCS, SCS⁷

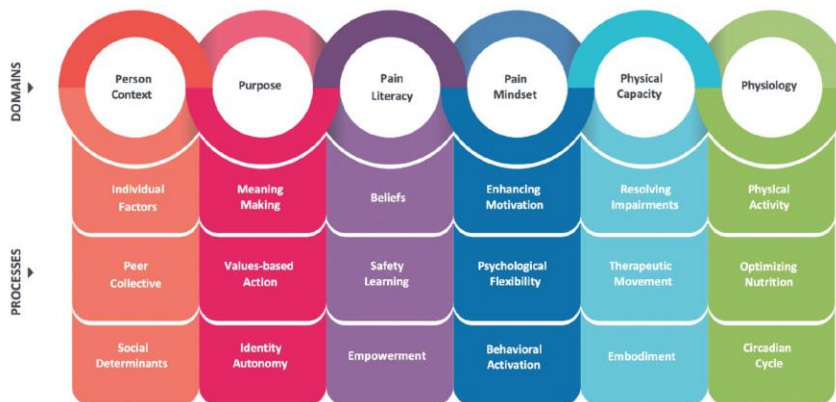


Figure 2. PRISM model.



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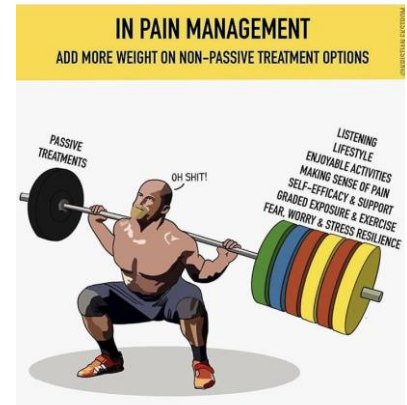


"If the solution is complicated it's not a solution, it's another problem."

Dr. Satchin Patel

The central approach for LPP & PFD should be

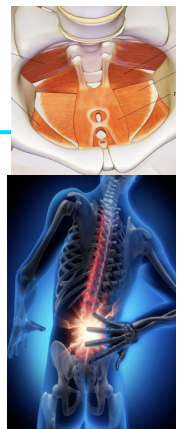
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Participant Takeaways

- LPP and PFD co-exist and appear to co-relate
- Tendency to assume a peripherally-oriented relationship between LPP and PFD
 - unsubstantiated assumptions
- Current state of the science:
 - Supports lens of psychoneuroimmunology for LPP & PFD
- LPP and PFD should always be considered for clients presenting with either concern.
- Ensuring your client understands their health state and are motivated to create their own health is key.



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PELVICON

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Thank You

Questions?

Sinead Dufour, PT PhD
sdufour@mcmaster.ca



PELVICON

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Central Sensitisation – what's our role?

Michelle Lyons



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Michelle Lyons



About Me

- Graduate of UCD's School of Physiotherapy
- Postgraduate in Botanical & Herbal Medicine (University of Arizona)
- Postgraduate in Health Coaching & Nutrition (University of Galway)
- Teacher training qualifications in yoga, pilates & mindfulness
- Instagram: michellelyons_muliebrity

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Financial Disclosures

- Owner/Operator at CelebrateMuliebriety.com:
- Online/ Live Continuing Education in Women's Health
- Other affiliations include:
 - FIFA
 - Sport Ireland
 - Pelvic Health Solutions



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Central Sensitisation

- What is it?
- Why does it matter in pelvic rehab?
- What are WE going to do about it?



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Does it matter in Pelvic Rehab?

[International Urogynecology Journal](#) > Article

Evaluation of Central Sensitisation in Bladder Pain Syndrome: A Systematic Review

Review Article | Published: 07 May 2024

Volume 35, pages 1109–1118, (2024) [Cite this article](#)



International Urogynecology Journal

[Aims and scope](#) →

[Submit manuscript](#) →

Central sensitisation in pelvic pain: A cohort study

Amelia Ryan et al. Aust N Z J Obstet Gynaecol. 2022 Dec.

PubMed[®]
Advanced User Guide



Association of Central Sensitization Inventory Scores With Pain Outcomes After Endometriosis Surgery

Natasha L Orr et al. JAMA Netw Open. 2023.



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What Is Pain?

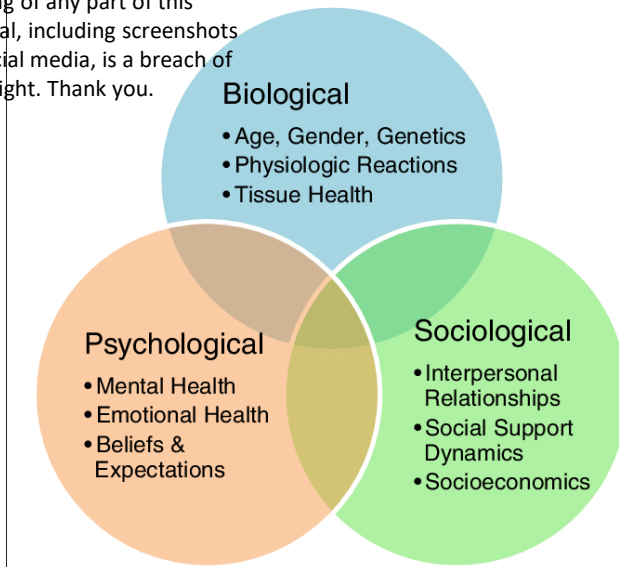
- Nociceptive
- Neuropathic
- Nociplastic
- (but why is pelvic pain different?)



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Where do we start?

- 'Start where you are' – where they are and where they need us to be
- Instead of 3 separate domains – think of cake!

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What is it?

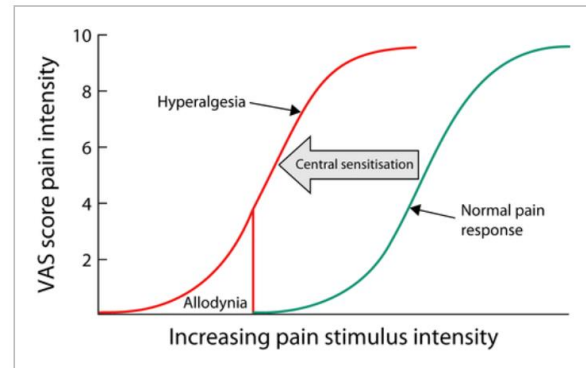
- **'Central sensitization** provides an evidence-based explanation for many cases of 'unexplained' chronic musculoskeletal pain' (Nijs et al 2011)



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What's happening in CS?

- Persistence of the noxious activation can cause upregulation in the number and activity of peripheral nociceptors which causes an increase in the responsiveness of the CNS neurons
- Normal sensory inputs, such as heat/ touch/ bladder filling, begin to elicit abnormally painful responses
- The pain feels like it originates in the periphery, but it is an abnormal sensory processing in the CNS



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Nijs et al 2021

- Central sensitisation, defined as an amplification of neural signalling within the CNS that elicits pain hypersensitivity
- Within individual pain conditions, there is substantial variation among patients in terms of presence and magnitude of central sensitisation, stressing the importance of individual assessment. Central sensitisation predicts poor treatment outcomes in multiple patient populations.



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Can we assess it?

- The CSI consists of two parts.
- Part A includes 25 questions related to common CSS symptoms.
- Part B determines if the patient has been diagnosed with certain CSS disorders or related disorders, such as anxiety and depression.
- The CSI has been validated in various languages



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CENTRAL SENSITIZATION INVENTORY: PART A

Name: _____ Date: _____

Please circle the best response to the right of each statement.

1	I feel tired and unrefreshed when I wake from sleeping.	Never	Rarely	Sometimes	Often	Always
2	My muscles feel stiff and achy.	Never	Rarely	Sometimes	Often	Always
3	I have anxiety attacks.	Never	Rarely	Sometimes	Often	Always
4	I grind or clench my teeth.	Never	Rarely	Sometimes	Often	Always
5	I have problems with diarrhea and/or constipation.	Never	Rarely	Sometimes	Often	Always
6	I need help in performing my daily activities.	Never	Rarely	Sometimes	Often	Always
7	I am sensitive to bright lights.	Never	Rarely	Sometimes	Often	Always
8	I get tired very easily when I am physically active.	Never	Rarely	Sometimes	Often	Always
9	I feel pain all over my body.	Never	Rarely	Sometimes	Often	Always
10	I have headaches.	Never	Rarely	Sometimes	Often	Always
11	I feel discomfort in my bladder and/or burning when I urinate.	Never	Rarely	Sometimes	Often	Always
12	I do not sleep well.	Never	Rarely	Sometimes	Often	Always
13	I have difficulty concentrating.	Never	Rarely	Sometimes	Often	Always

Ryan et al 2022

Central sensitisation in pelvic pain: A cohort study

- Central sensitisation leads to pain amplification and impacts on the management of pelvic pain .
- Identification of CS in patients with PP may provide additional treatment pathways and improve patient outcomes.



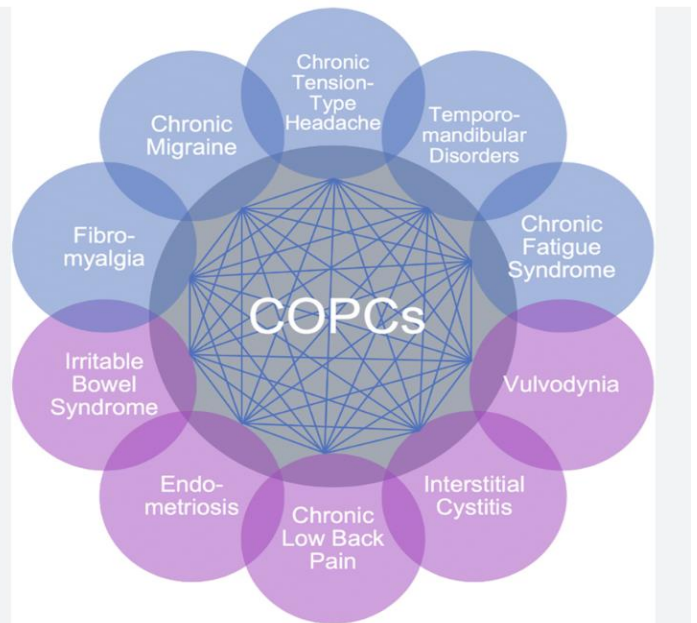
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Who are the COPCs?

- A group of disorders sharing common symptoms...with pain as the leading feature
- **Chronic Pelvic Pain and the Chronic Overlapping Pain Conditions in Women Kumar & Scott 2020**



395



Offiah et al 2022

- ‘Present status & advances in bladder pain syndrome; central sensitization & the urinary microbiome’



396

Tissue injury – inflammation – tissue repair
Sensory afferents – hyperalgesia – protection

Temporary...Persistent: the pain becomes the problem

‘Central sensitisation is the augmentation of responsiveness of central pain-signalling neurons from low threshold mechanoreceptors’

Original Investigation | Obstetrics and Gynecology



February 27, 2023

Association of Central Sensitization Inventory Scores With Pain Outcomes After Endometriosis Surgery

Natasha L. Orr, PhD^{1,2}; Alice J. Huang, BSc²; Yang Doris Liu, MS²; [et al](#)

» [Author Affiliations](#) | [Article Information](#)

JAMA Netw Open. 2023;6(2):e230780. doi:10.1001/jamanetworkopen.2023.0780

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397

Orr et al 2023

- An increasing number of CSS (central sensitivity syndromes) was significantly correlated with **dysmenorrhea, deep dyspareunia, dyschezia, and chronic pelvic pain scores and with the CSI score**
- A CSI cut off of 40 had a sensitivity of 78% and a specificity of 80% for identifying a patient with endometriosis with ≥ 3 CSS.
- In the group with $CSI \geq 40$, 18% retrospectively self-reported pain nonresponsive to hormonal therapy.
- **In conclusion, a $CSI \geq 40$ may be a practical tool to help identify patients with endometriosis with pain contributors related to central nervous system sensitization.**

398

Orr et al 2023

- A key clinical problem is identifying the patient with endometriosis whose pain is complicated by central nervous system sensitization, where conventional gynecologic treatment (eg, hormonal therapy or surgery) **may not completely alleviate the pain..**



399

Orr et al 2023

A subset of people who undergo surgery for endometriosis have persistent pain, suggesting that other factors besides the endometriosis, such as central sensitization, may play a role in this pain.

The Central Sensitization Inventory may identify individuals with endometriosis who have more pain after surgery due to pain sensitization.

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400

Shafrir et al 2021

- Treatment for endometriosis has traditionally focused on the lesions; however, endometriosis is a heterogeneous disease with multiple pain mechanisms that are not limited to only the lesions.



PELVICON



401

Shafrir et al 2021

- 'Further, co-existing pelvic floor tenderness and CNS pain amplification may explain why some women with pelvic floor tenderness do not respond solely to peripherally directed treatments such as pelvic floor physical therapy.'



PELVICON



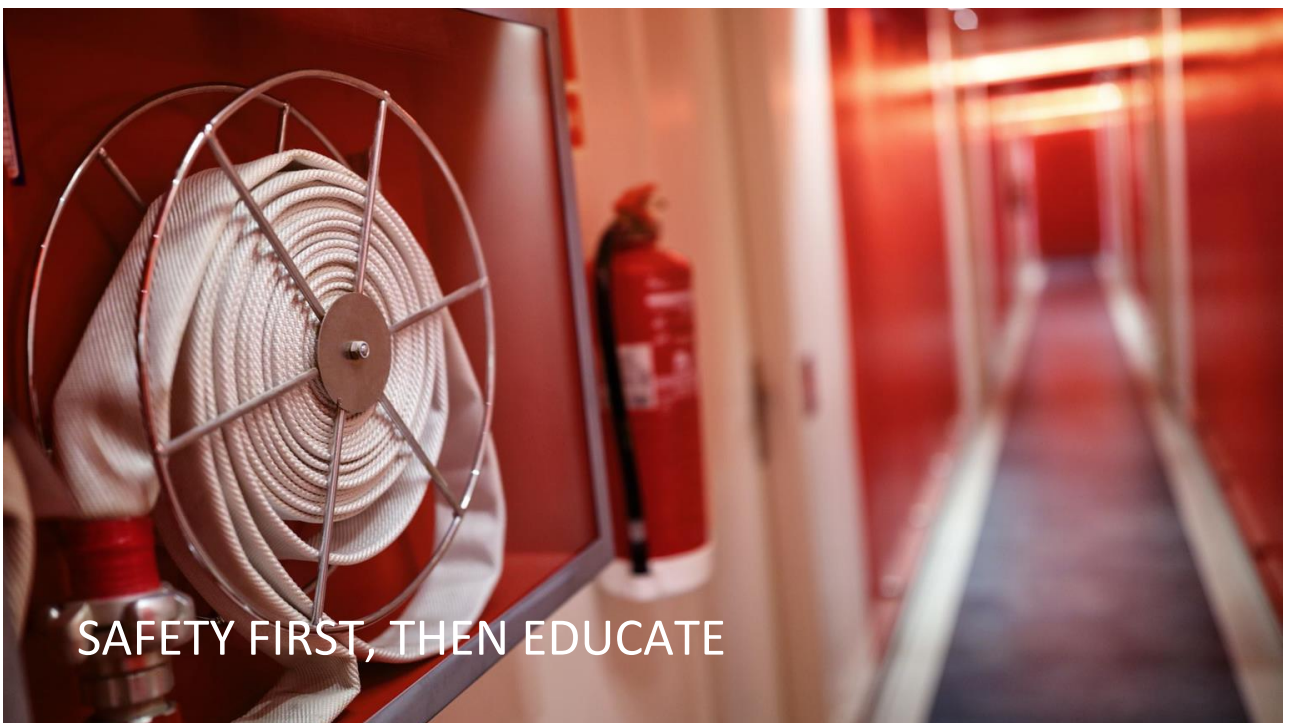
402

The plan

- Calm the systems down
- Engage in conversation
- Build resilience



403

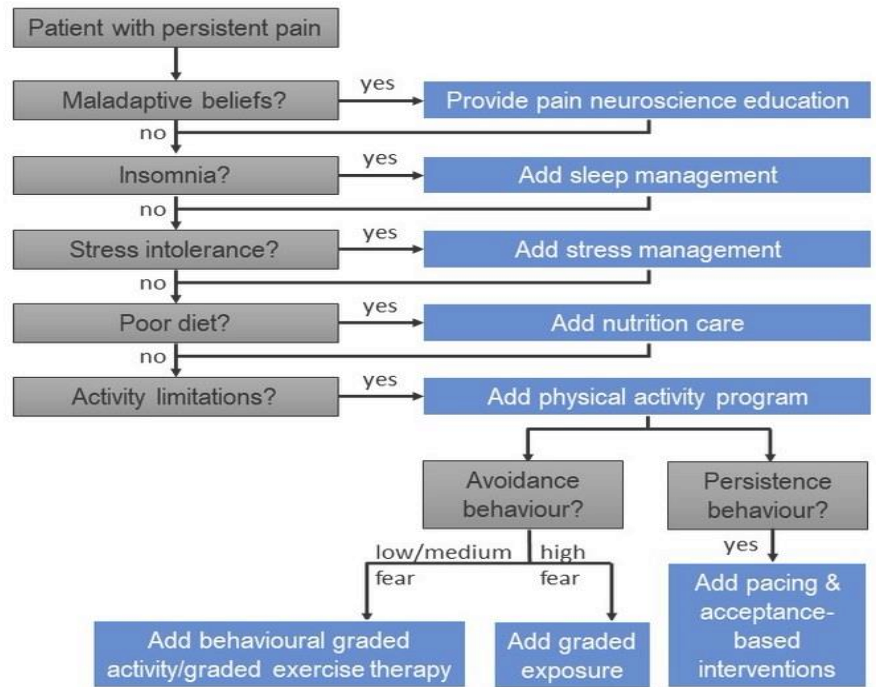


SAFETY FIRST, THEN EDUCATE

404

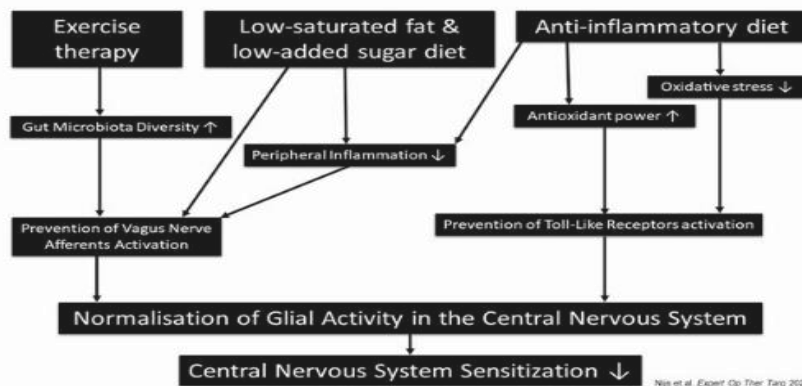
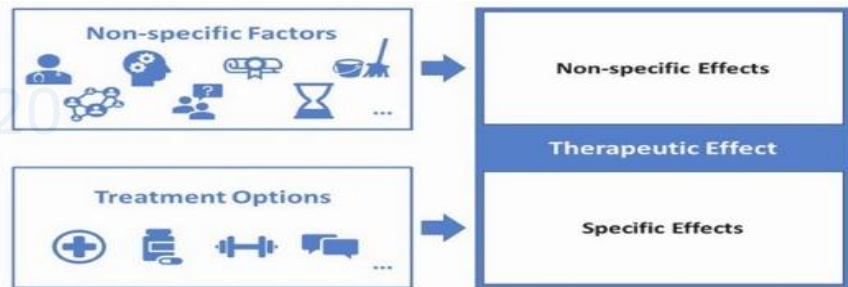
Where do we start?

Nijs et al 2022



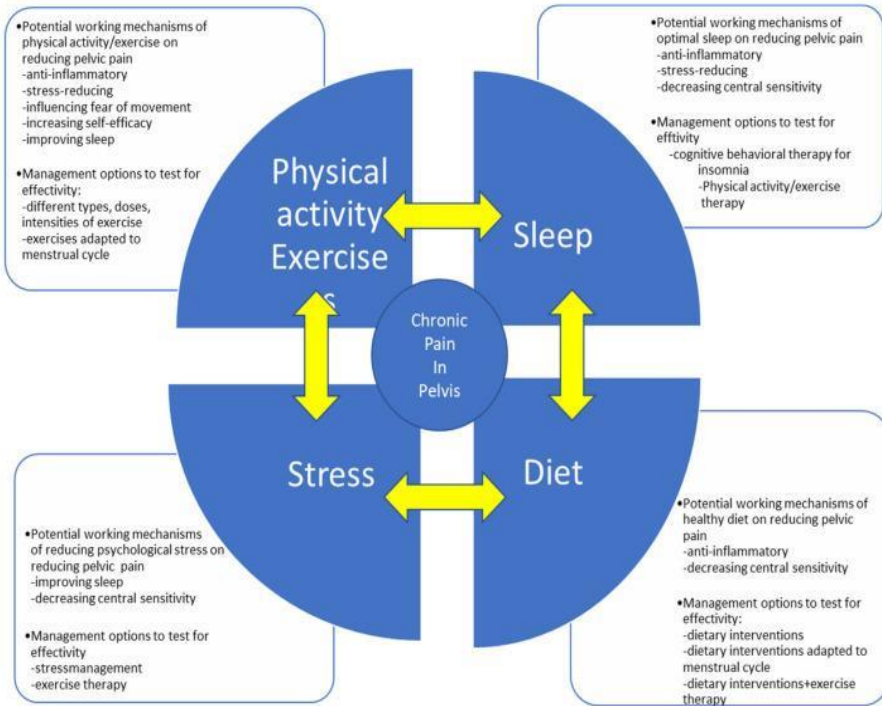
405

Nijs et al 2020



Nijs et al. *Expert Opin Ther Targets* 2020, 24(8):793-803.

406



GUTKE ET AL
2021

'Lifestyle and Chronic Pain in the Pelvis: State of the Art and Future Directions'

407

Nijs et al 2024

- The importance of **sleep** in the paradigm shift from a tissue and disease management approach towards a multi-modal lifestyle interventions for chronic pain'



The importance of sleep in the paradigm shift from a tissue- and disease-based pain management approach towards multimodal lifestyle interventions for chronic pain

Brazilian Journal of Physical Therapy 28 (2024) 100594



Fig. 1 The pro-inflammatory (left) and immune depressing (right) effects of sleep disturbances such as insomnia.

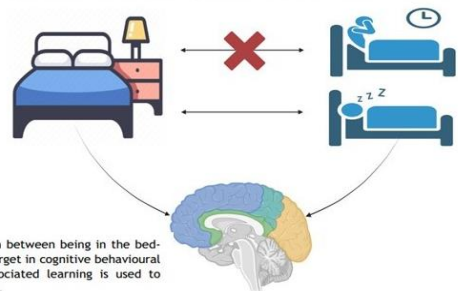


Fig. 2 The disrupted association between being in the bedroom and sleeping as treatment target in cognitive behavioural therapy for insomnia, where associated learning is used to restore this connection in the brain.

408

Education

- Making it make sense
- Provide a limited buffet of choices to start with



409



Does this mean no manual therapy?

- Have a conversation with the NS; calm it down, decrease startle/allodynia, increase resilience
- DNIC
- What is it?
- How can we use it?



410

[Pain](#). 2023 Mar; 164(3): 463–468. Published online 2022 Jun 17. doi: [10.1097/j.pain.00000000000002719](https://doi.org/10.1097/j.pain.00000000000002719)

PMCID: PMC9916052 | PMID: [36017879](https://pubmed.ncbi.nlm.nih.gov/36017879/)

Diffuse noxious inhibitory controls and conditioned pain modulation: a shared neurobiology within the descending pain inhibitory system?

[Laura Sirucek](#),^{Ma,b,*} [Robert Phillip Ganley](#),^c
[Hanns Ulrich Zeilhofer](#),^{b,c,d} and [Petra Schweinhardt](#)^a

What does a bps approach look like?



411

danger

- The danger of pain
- and
- the danger of pain neuroscience education...



412

Locke et al 2019

- ‘Management of pelvic floor muscle pain with pelvic floor physiotherapy incorporating neuroscience-based pain education: a prospective case-series report’



Significant improvement in coping and reduced catastrophising and reduction in co-existing pelvic floor symptoms (PFBQ)

On follow up, 8/11 reported to be ‘very much better’ or ‘much better’

413

Locke et al 2019

- Strategies:
- Down-training PFM techniques
- Education on female arousal
- Focus on maintaining relaxation during self-penetration with vaginal ‘trainers’ (dilators) while avoiding threatening evaluation of sensations.
- Guidance on resumption of penetrative intercourse after successful progress with vaginal dilators
- Bladder/bowel education as needed



Education:

Beliefs & expectations + understanding of pain /coping mechanisms

Importance of developing active coping strategies – pacing, relaxation, stretching, breathing and graded exercise taught and coached

the hope of change due to neuroplasticity a pathway to recovery illustrated with active strategies promoting change and improved function

414

So...

- A whole person approach...but make it multi-modal!



415

Frawley H, Peterson K, (2022)

All clinicians should ask about the patient's understanding of their pain and provide pain education.

Pelvic health physiotherapists should assess the patient's physical functioning and ask about sexual activity, bowel, and bladder function.

Ensure patients are assessed holistically, the symptoms of endometriosis are not heterogenous and are influenced by a multitude of factors.

Recognize that a patient's coping mechanisms may be strongly related to psychosocial factors.

Discuss alternative options to surgery and medication and explore the patient's preferences and goals.

Physiotherapists are well placed to discuss options to improve quality of life where medical approaches are not the preferred option, or the patient wishes to try alternatives.

416

Accepted: 14 December 2023
DOI: 10.1111/pain.15284

SYSTEMATIC REVIEW

BJOG An International Journal of Obstetrics and Gynaecology

Treatment recommendations for the management of persistent pelvic pain: a systematic review of international clinical practice guidelines

Amelia K. Mardon¹ | Hayley B. Leake^{1,2} | Kimberley Szeto^{1,3} | Thomas Astill⁴ | Sandra Hilton⁵ | Graham Lorimer Moseley⁴ | Katherine Jane Chalmers^{1,6}

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Abstract

Background: Females with persistent pelvic pain (PPP) report great variability in the treatments recommended to them despite the availability of clinical practice guidelines (CPGs) that aim to standardise care. A clear consensus for the best practice care for PPP is required.

Objective: To identify and summarise treatment recommendations across CPGs for the management of PPP, and appraise their quality.

Search strategy: MEDLINE, CENTRAL, EMBASE, EmCare, SCOPUS, the Cochrane Database of Systematic Reviews, Web of Science Core Collection and relevant guideline databases were searched from their inception to June 2021.

Selection criteria: Included CPGs were those for the management of urogynaecological conditions in adult females published in English, of any publication date, and endorsed by a professional organisation or society.

Data collection and analysis: We screened 1379 records and included 20 CPGs. CPG quality was assessed using The Appraisal of Guidelines for Research and Evaluation II (AGREE-II) tool. Descriptive synthesis compiled treatment recommendations across CPGs.

Main results: The CPGs for seven conditions provided 270 individual recommendations. On quality appraisal, guidelines on average scored 'excellent' for the domains 'scope and purpose' (80.6%, SD = 12.3) and 'clarity and presentation' (74.4%, SD = 12.0); for other domains, average scores were satisfactory or poor. Four guidelines (for Endometriosis, NICE, RANZCOG and ESHRE for polycystic ovary syndrome; Teede et al. 2018, *International Evidence Based Guideline for the Assessment and Management of Polycystic Ovary Syndrome*, Monash University, Melbourne, Australia) were deemed recommended for use. Recommendations were most frequent for pharmaceutical and surgical interventions. Recommendations were variable for psychological, physiotherapy and other conservative interventions.

Conclusions: The quality of CPGs for PPP is generally poor. Several CPGs endorse the consideration of biopsychosocial elements of PPP. Yet most recommend pharmaceutical, surgical and other biomedical interventions.

BJOG 2022;00:1–15.

wileyonlinelibrary.com/journal/boj

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PAIN®

Search MENU Next >

RESEARCH PAPER

"I wish I knew then what I know now" - pain science education concepts important for female persistent pelvic pain: a reflexive thematic analysis

Mardon, Amelia K.^{a,b}; Chalmers, K. Jane^{a,b}; Heathcote, Lauren C.^{b,c}; Curtis, Lee-Anne^a; Freedman, Lesley^d; Malani, Rinkle^e; Parker, Romy^{b,f}; Neumann, Patricia B.^a; Moseley, G. Lorimer^{a,b}; Leake, Hayley B.^{a,b,*}

Author Information ☺

PAIN (J):10.1097/j.pain.0000000000003205, March 6, 2024. | DOI: 10.1097/j.pain.0000000000003205

MARDON ET AL 2024

Pain science education (PSE) provides people with an understanding of "how pain works" grounded in the biopsychosocial model of pain; it has been demonstrated to improve outcomes in musculoskeletal pain conditions.

Preliminary evidence suggests PSE may be effective for female individuals with persistent pelvic pain, but how the content of PSE needs to be modified for this group remains to be determined

MARDON ET AL 2024

- 1) **“A sensitised nervous system leads to overprotective pain”** validated their pelvic pain as being real
- (2) **“Pain does not have to mean the body is damaged (although sometimes it does)”** provided reassurance that pelvic pain does not mean their condition is worsening
- (3) **“How I think, feel, and ‘see’ my pain can make it worse”** enabled participants to find optimal ways to manage their pain
- (4) **“I can change my pain... slowly”** provided hope that pelvic pain can improve and empowered them to pursue pain improvement as a viable goal

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What do we do?

- Screen for Central Sensitization – use questionnaires such as CSI, DASS, PCS, TK5
- Calm the NS – breath, sleep, nutrition, non-nociceptive manual therapy, sub-threat movement (eg feet, thoracic mobility) – ‘Am I Safe?’
- Education about how we think and the influence of that on pain
- But also...TENS (Nijs et al 2011: ‘Treatment of central sensitization in people with chronic pain’)



420

Think like a farmer...

- Don't blame the crops...think about the soil
- Irrigation & the right type of fertilizer
- Remove the weeds
- You can't control the weather, but you can prepare for it



421

[JAMA Netw Open](#). 2024 Apr; 7(4): e246026.

Published online 2024 Apr 11.

doi: [10.1001/jamanetworkopen.2024.6026](https://doi.org/10.1001/jamanetworkopen.2024.6026)

PMCID: PMC11009829 | PMID: [38602675](https://pubmed.ncbi.nlm.nih.gov/38602675/)

Physician Empathy and Chronic Pain Outcomes

[John C. Licciardone](#), DO, MS, MBA,¹ [Yen Tran](#), BS,²

[Khang Ngo](#), BSA,² [David Toledo](#), BA,²

[Navya Peddireddy](#), BS,² and [Subhash Aryal](#), PhD³

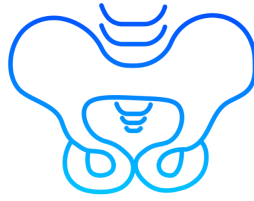
Empathy from a healthcare provider was associated with better patient outcomes, including patient-reported pain, function and HRQOL

Clinical Takeaways

- All pain is both **emotional AND physical**, whether current or potential; pelvic pain in particular, and menstrual/ endo pain especially
- Safety is vital – the nervous system can't hear you if it is scared, or tired, or hungry (or if it thinks you don't believe it) and **#knowledgeispower**
- We have validated measurements of CS and validated strategies to help with it – someone with CS has **nociplastic** pain

422

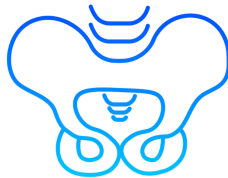
Q&A



P E L V I C O N

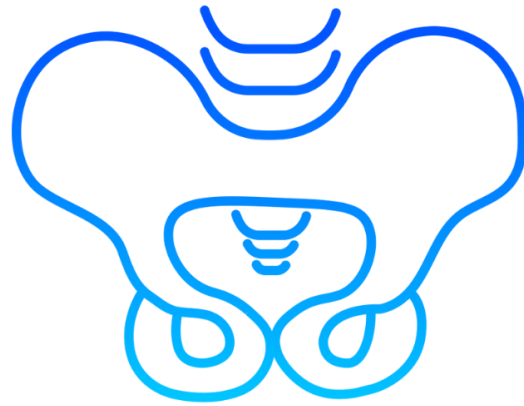
423

Giveaway!



P E L V I C O N

424



P E L V I C O N

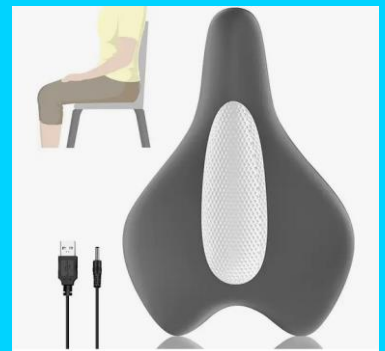
425

Technologies for Pelvic Health: Gimmick or Gold?


Sinéad Dufour, PT PhD




P E L V I C O N



426



Sinéad Dufour



PELVICON

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About Me

- **Academic Clinician**
- **Consulting Expert**
- **Clinical Educator**
- **Student**
- **Mother**
- **Advocate**



Presentation Outline

- Establishing Context
 - review landscape of pelvic health technologies
 - why pelvic health technologies?
- Self-administered mHealth technologies
 - app and app + device
- Clinic-administered technologies
 - HIFEM & FMS technology (Emsella & Pelvipower)
 - CO₂ Lazer (Mona Lisa)
- Virtual care



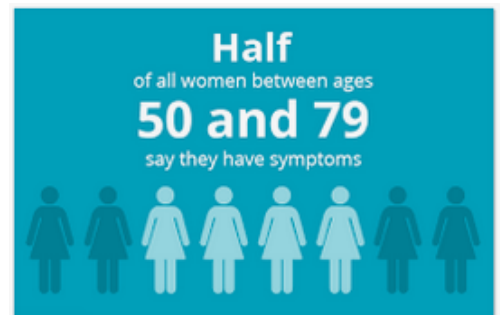
428

Pelvic Floor Dysfunction

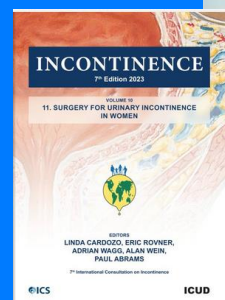
- An umbrella term
- Describes various symptoms and conditions that are characterized by the pelvic floor and associated connective tissue not optimally functioning



429



- Help seeking is low – 25%
 - stigma / shame
 - ignorance & unhelpful beliefs
 - normal/expected
 - unaware of conservative care
 - conservative care not helpful
 - access issues
 - preference for self-management
- Clear care guidelines established
 - high levels of evidence
- Recommendations not enacted well



430

Landscape of pelvic health technologies

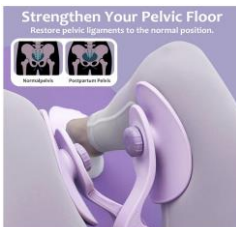
- eHealth and mHealth options proliferating - high speed!
 - **eHealth** - using information and communication technologies in health care, often delivered through the Internet.
 - **mHealth** - included under the umbrella term eHealth interventions
 - health practice supported by mobile devices, patient monitoring devices, personal digital assistants and other wireless devices
 - people-centred, trust-based, evidence-based, effective, efficient, sustainable, inclusive, equitable and contextualised.
- Currently, hundreds of mHealth apps (iOS and Android)
 - platforms primarily **assist with PFMT for PFD (notably UI*)**



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Landscape of pelvic health technologies

- Novel self-administered and clinic-based technologies that don't fall under eHealth also emerging!
- Large claims
- In some cases, large price tags \$\$\$



432

Is there a role for these technologies?

How do we wade through the noise to determine:

- **What is gimmick?**
- **What is gold?**

Reflections: Dr. Carolyn Best

- Women suffer unnecessarily with SUI "for years"
- Few have had proper assessment of pelvic floor upon presentation
- Most were not provided the recommended PFMT as first line
- Many say they already tried "kegels" & "they don't work"
- Most unaware that surgical intervention & medication not first line
- Many don't want surgery- are seeing me for advice & counselling
 - Bottleneck & access issues



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GIMMICK - claims and no substance



Vaginal Portable Rejuvenation Wand For Bacterial Vaginosis Treatment, Red & Blue Light...

especially recommended for postpartum repair



normal pelvis postpartum pelvic



Pelvic Floor Muscle Strengthening, Kegel Exerciser Pelvic Floor Stimulator, Thigh Master Exercise Equipment, Hip Inner Leg Thigh...





434

Start with the evidence

International Urogynecology Journal (2020) 31:1163–1174
<https://doi.org/10.1007/s00192-019-04012-w>

REVIEW ARTICLE

Mobile technologies for the conservative self-management of urinary incontinence: a systematic scoping review

Stéphanie Bernard^{1,2} · Sabrina Boucher² · Linda McLean³ · Hélène Moffet^{1,2}



Journal of Obstetrics and Gynaecology Canada

Available online 21 October 2022
 In Press, Journal Pre-proof [What's this? >](#)



SOCC Technical Update

Technical Update No. 433: eHealth Solutions for Urinary Incontinence among Women

Sinéad Dufour PhD, Aisling Clancy MD, Maria Wu MD,
 SOGC Urogynaecology Committee (2022), Baharak Amir, Aisling Clancy, Laura Didominzio,
 Sinéad Dufour, Cathy Flood, Dobrochna Gliberman, Manyse Larouche (co-chair), Ola Malabarey,
 Dante Pascali (co-chair), Maria Wu



Digital Technologies for Women's Pelvic Floor Muscle Training to Manage Urinary Incontinence Across Their Life Course: Scoping Review

Stephanie J Woodley, BPhy, MSc, PhD, Brittany Moller, BSc (Hons), [...], and Jennifer Kruger, BSc, MSc, PhD

Int Urogynecol J. 2022; 33(12): 3325–3354.
 Published online 2022 May 26. doi: [10.1007/s00192-022-05222-5](https://doi.org/10.1007/s00192-022-05222-5)

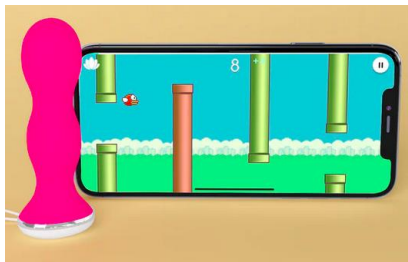
PMCID: PMC9135393
 PMID: 35616695

The effectiveness of eHealth interventions on female pelvic floor dysfunction: a systematic review and meta-analysis

Ping Xu,^{1,2} Xiaojuan Wang,^{1,2} Pingping Guo,^{1,2} Wei Zhang,^{1,2} Minna Mao,^{1,2} and Suwen Feng²



435



- Benefits of using mobile technologies
- Improvements across outcomes
 - satisfaction, adherence and costs
 - LoE = 2
- Improvements across all degrees of severity of UI symptoms
- Advantage = embedded principles of self-management support
- Over half studies included interactions with a HCP, likely optimal*

International Urogynecology Journal (2020) 31:1163–1174
<https://doi.org/10.1007/s00192-019-04012-w>

REVIEW ARTICLE

Mobile technologies for the conservative self-management of urinary incontinence: a systematic scoping review

Stéphanie Bernard^{1,2} · Sabrina Boucher² · Linda McLean³ · Hélène Moffet^{1,2}



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- Qualitative synthesis
 - 41 studies analyzed across 14 countries
- Over half the studies = PFMT programs drawn from known evidence-base
- large variation in dose parameters and supervision vs no supervision
- 60% DTs contained educational information (PF anatomy, lifestyle factors etc..)
- Over half the studies confirmed improvement across outcomes
- Several care barriers overcome with DTs
 - integrating care from HCP likely optimal

JMIR MHEALTH AND UHEALTH

Woodley et al

Review

Digital Technologies for Women's Pelvic Floor Muscle Training to Manage Urinary Incontinence Across Their Life Course: Scoping Review

Stephanie J Woodley¹, BPhy, MSc, PhD; Brittany Moller¹, BSc (Hons); Alys R Clark², BA, MMathSc, PhD; Melanie D Bussey³, BPE, MSc, PhD; Bahram Sangelaji^{1,4}, PT, PhD; Meredith Perry⁵, BPhy, MManipTh, PhD; Jennifer

437



- But what about the issue of 30% of people doing an "incorrect" PFM contraction when cued?
- Surely everyone NEEDS an internal exam to benefit from PFMT- right?



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"Many of the included studies did not provide supervision for the PFMT, even though contractions performed incorrectly, for example in cases where a patient practices a bearing down maneuver believing it to be a proper PFM contraction, may, in fact, cause a deterioration in their symptoms as opposed to an improvement – yet this was not generally the case as all studies suggested that UI symptoms improved with the mobile technology intervention compared to a control, even in the context of poor or lack of supervision by a healthcare provider." (Bernard et al, 2019)

mHealth Apps: Recommendation



SOGC Technical Update

Technical Update No. 433: eHealth Solutions for Urinary Incontinence among Women

Sinéd Dufour PhD, MSc, Aisling Clancy MD, Maria Wu MD, SOGC Urogynaecology Committee (2022), Baharak Amir, Aisling Clancy, Laura Didomizio, Sinéd Dufour, Cathy Flood, Dobrochna Globerman, Maryse Larouche (co-chair), Ola Malabarey, Dante Pascali (co-chair), Maria Wu

mHealth solutions, such as applications founded on evidence-based, **motivational, behavioural intervention principles**, should be recommended to women with stress urinary incontinence if tailored personalized care is not available or accessible (**strong, high**)



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mHealth Apps: Gimmick or Gold?

- apps based on evidence -informed PFMT principles
- incorporating information related to anatomy and lifestyle interventions following principles of self-management support & behaviour change



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mHealth App + Device

JMIR MHEALTH AND UHEALTH

Dufour et al

Original Paper

Exploring the Impact of a Mobile Health Solution for Postpartum Pelvic Floor Muscle Training: Pilot Randomized Controlled Feasibility Study



Sinéad Dufour¹, PhD; Donna Fedorkow², MD; Jessica Kun³, BSc, MSc; Shirley Xiaoxuan Deng⁴, BHSc; Qiyin Fang^{3,4}, PhD

¹School of Rehabilitation Science, McMaster University, Hamilton, ON, Canada

²Department of Obstetrics & Gynecology, McMaster University, Hamilton, ON, Canada

³School of Biomedical Engineering, McMaster University, Hamilton, ON, Canada

⁴Department of Engineering Physics, McMaster University, Hamilton, ON, Canada



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Exemplar Quotes (Dufour et al, 2020)

Pro

"I liked how on the strengthening aspect graded the strength of the contraction, that was cool visual feedback"

"Seeing your score and being able to keep track of your score so that you were working towards something was motivating. The other part was being able to see other peoples scores, that helped to give you a sense of where you ranked in comparison to other people"

Con

"I really haven't been using it - because it is big and frankly the idea of inserting it is not appealing"

"It is not useful to just have this device without having the assessment and some discussion with an expert."

"I was excited when I got put in the intervention group but the device is cumbersome to use so I actually haven't used it".



442

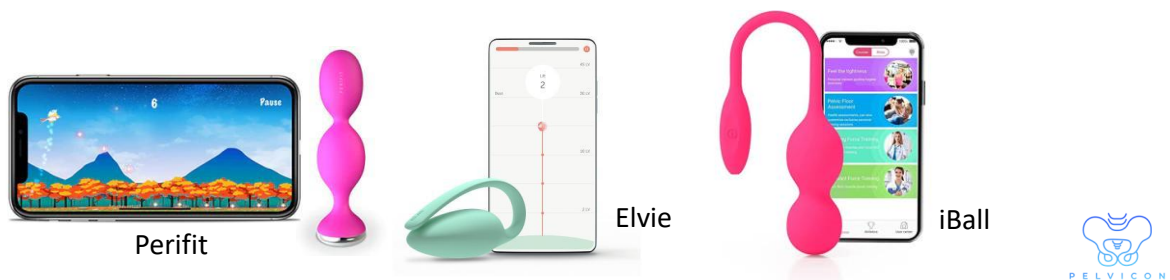
mHealth App + Device: Recommendation



SOGC Technical Update
Technical Update No. 433: eHealth Solutions for Urinary Incontinence among Women

Sinead Dufour PhD, BA, Aisling Clancy MD, Maria Wu MD,
SOGC Urogynaecology Committee (2022), Baharak Amir, Aisling Clancy, Laura Didomizio,
Sinead Dufour, Cathy Flood, Dobrochna Globberman, Maryse Larouche (co-chair), Ota Malabary,
Diane Pascale (co-chair), Maria Wu

There is **insufficient evidence** to recommend the routine use of mHealth interventions that include a physical device to improve stress urinary incontinence symptoms (**conditional, very low**)



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mHealth Apps + Device: Gimmick or Gold?

- Low level of evidence
- Not all devices are equally sensitive
- Beware of **claims** made by manufacturers - **Gimmick**
 - The only connected device which uses a unique patented double pressure-sensor to identify faulty pelvic floor muscle contractions (PERIFIT).
 - Smart Kegel trainer to strengthen your pelvic floor (ELVIE).
- Select clients carefully and ensure they are clear these are biofeedback tools - not EMS
- For **certain clients** - has **GOLD potential***



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**When claims don't
match utility...**

**Don't confuse the
what with the how!**



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Clinic-based technologies

- HIFEM Technology & FMS - Emsella & Pelvipower
- CO₂ Vaginal Lazer - Mona Lisa



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HIFEM Technology - Emsella Claims

- This unique technology revolutionizes intimate health by providing those suffering from incontinence with a completely non-invasive
- The BTL Emsella chair is a non-invasive in-office treatment option for SUI and UUI incontinence.
- Daily Kegel exercises are a thing of the past...now you can simply sit on a comfortable chair that incorporates high-intensity focused electromagnetic energy (HIFEM) to contract your pelvic floor muscles over 10,000 times in a 28 min session. Clothed and comfortable, you sit in this chair while the high-frequency energy does the work for you.



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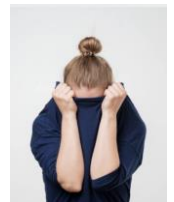
Emsella - BTL



I love riding my girlfriend Emsella at the doctor's office. Twice a week for three weeks, I zip into a little room at Compass Dermatology in Toronto, close the door and straddle what looks like an overturned dome. I sit astride her like a jaunty cowgirl, and when I emerge 28 minutes later, I've "done" 11,000 Kegels and my pelvic floor is practically 20 years old again (okay, fine—23 years old!).

"The Kegel Throne" or, its official name, Emsella, is a powder-blue chair supercharged with technology that stimulates pelvic floor muscles with high-intensity focused electromagnetic energy to help treat incontinence. The co-founder of Compass, dermatologist Julia Carroll, brought it into her practice after she had success using it herself.

"I'm a woman over 40 who has had a child, so you do the math," she says wryly. "Fifty-year-olds should not be wearing diapers! Why do we accept that as women?"



448

Emsella - BTL



Sinéad Dufour, a pelvic health physiotherapist and associate clinical professor at McMaster University's School of Rehabilitation Science, says early studies on Emsella are promising and it can be a useful tool, but it should only be used as part of a holistic and individualized pelvic health regimen that includes a full assessment by someone who works within urogynecology.

"Anything we can do to keep women away from medication or surgery is for the better," she says. "But if someone is offering this and they don't have a nurse continence advisor, a physio or anyone who knows anything about urogynecology involved, I would be running for the hills."

Context is Queen



449

FMS technology - Pelvipower Claims

Method: The entire muscular system of the pelvis as well as the hip, buttock and thigh area are reached by repetitive and short magnetic field pulses. The method of "Functional Magnetic Stimulation" (FMS) is comparable to "Functional Electrical Stimulation" (FES) in its effect, but with the advantage that it achieves a higher depth effect more gently and non-invasive.



GYNAECOLOGY

Menopause
Libido
Sexual functions
Dysmenorrhoea
Prolapse



POST PARTUM

Postpartum
recovery



INCONTINENCE

Stress incontinence
Urge incontinence/
OAB syndrome
Mixed incontinence
Faecal incontinence



PHYSIOTHERAPY

Strengthening and
Relaxation of the Pelvic Floor
and surrounding rump,
hip and gluteal muscles
Lower back pain



UROLOGY

Erectile
dysfunction
Before and after
Prostatectomy



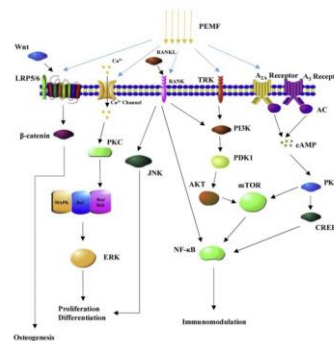
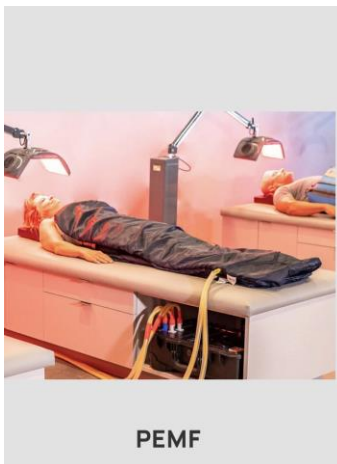
450

Challenges to claims

- Promotion of passive care
- Lack of clarity of mechanism of action
 - Assumes strengthening as key - "the more kegels the better"
 - Does not align with study outcomes (Emsella)
 - "Jack of all trades" (Pelvipower)
 - No articulation of of the PEMF component
 - Well substantiated in the health and performance literature
 - What about other benefits of muscle contractions?
- Positioned as a standalone care option
- Is the problem with the how vs. the what?



451



Review > [Bioelectromagnetics](#). 2020 May;41(4):263-278. doi: 10.1002/bem.22258.

Epub 2020 Mar 11.

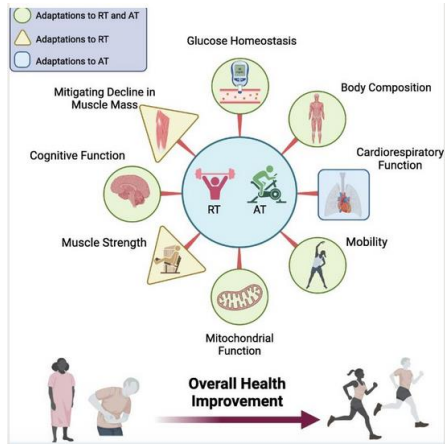
Effects and Mechanisms of Exogenous Electromagnetic Field on Bone Cells: A Review

Bin Zhang ^{1 2}, Yangli Xie ¹, Zhenhong Ni ¹, Lin Chen ¹





452

Exercise - much more than strengthening



Review

Exercise training mode effects on myokine expression in healthy adults: A systematic review with meta-analysis

Francesco Bettariga ^{a b}, Dennis R. Taaffe ^{a b}, Daniel A. Galvão ^{a b}, Pedro Lopez ^{c d e},
Chris Bishop ^f, Anna Maria Markarian ^{a b}, Valentina Natalucci ^g, Jin-Soo Kim ^{a b},
Robert U. Newton ^{a b h}  



453

Start with the evidence

Electrical muscle stimulation for the conservative management of female pelvic floor muscle dysfunction: A systematic scoping review

Guitar N¹, Dzieduszycki C², Akbari P³, Dufour S²



Journal of Women's Health Care

Havinka et al., J Women's Health Care 2019, 8:1
DOI: 10.4172/2167-0420.1000455

Research Article

Open Access

SEXUAL MEDICINE

The Use of HIFEM Technology in the Treatment of Pelvic Floor Muscles as a Cause of Female Sexual Dysfunction: A Multi-Center Pilot Study

Havinka TC¹, TurCan P² and Bader A³

WOMEN'S SEXUAL HEALTH

Electromyographic Evaluation of the Pelvic Muscles Activity After High-Intensity Focused Electromagnetic Procedure and Electrical Stimulation in Women With Pelvic Floor Dysfunction

Silantyeva Elena, MD, PhD,¹ Zarkovic Dragana, MSc,² Soldatskaia Ramina, MD,¹ Astafeva Evgeniia, MD,¹ and Mekan Orazov, MD, PhD¹



A Comparative Study on the Effects of High-Intensity Focused Electromagnetic Technology and Electrostimulation for the Treatment of Pelvic Floor Muscles and Urinary Incontinence in Parous Women: Analysis of Posttreatment Data

Elena Silantyeva, MD, PhD,* Dragana Zarkovic, MSc,† Evgeniia Astafeva, MD,* Ramina Soldatskaia, MD,* Mekan Orazov, MD, PhD,‡ Marina Belkovskaya, MD, PhD,* Mark Kurtser, MD, PhD,* and Academician of the Russian Academy of Sciences



454

Electrical muscle stimulation for the conservative management of female pelvic floor muscle dysfunction: A systematic scoping review

Guitar N¹, Dzieduszycki C², Akbari P³, Dufour S²



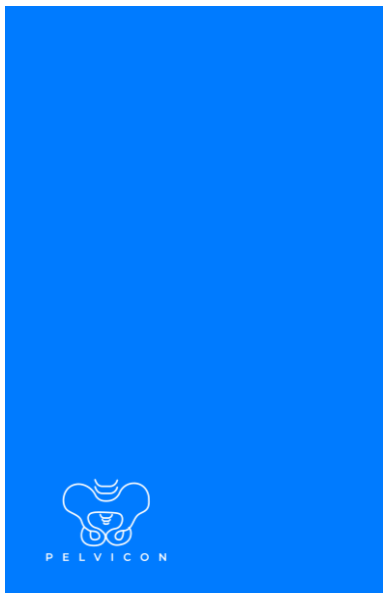
- limited research comparing differences in health outcomes across traditional and novel EMS tools which is needed to optimally integrate such tools.
- **Aim-** summarize & critically evaluate the literature on the effects of EMS-based modalities on PFD in adult women in comparison to other conservative care interventions



455

Electrical muscle stimulation for the conservative management of female pelvic floor muscle dysfunction: A systematic scoping review

Guitar N¹, Dzieduszycki C², Akbari P³, Dufour S²



Intravaginal vs. Extravaginal EMS

Intravaginal stimulation (n=19)

Extravaginal stim (n=15)

Studies did not specify (n=3)

Treatment time for significant improvement in symptoms:

- **Intravaginal mean = 659 min over 8 weeks**
- **Extravaginal mean = 388 min over 5 weeks**

High Intensity vs. Low Intensity EMS

Low intensity treatments (n = 23)

High intensity treatments (n = 9)

Studies did not report (n=8)

Treatment time for significant improvement in symptoms:

- **Low intensity (<50Hz) mean = 494 min over 8 weeks**
- **High intensity (≥50Hz) mean = 160 min over 4 weeks**

Magnetic vs. Non-Magnetic EMS

A total of 11 studies included magnetic EMS, the most common was Emsella's High Intensity Focused Electromagnetic Stimulation

Treatment time for significant improvement in symptoms:

- **Magnetic EMS mean = 162 min over 4 weeks**
- **Non-magnetic EMS mean = 662 min over 8 weeks**



CEOG

Clinical and Experimental Obstetrics & Gynecology

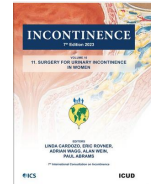
Editor-in-Chief
Michael H. Dahan



456

Emsella / Pelvipower: Gimmick or Gold?

- Significantly more data on Emsella vs. Pelvipower
 - Generally low-quality studies
 - Consistent trend across studies – significant improvement of outcomes over short time interval
 - Traditional EMS – Grade B evidence (ICI-7)
 - Magnetic stimulation – Grade B evidence (ICI-7)
- Beware of **claims** made by manufacturers – **Gimmick**
 - baseless claims - strengthening as key mechanism
 - pulsed magnetic stimulation component?
- Select clients carefully and ensure they are clear on the intended purpose of these tools and the current state of the science – integrate with HCP guidance
- For **certain clients** - has **GOLD potential***



457

CO₂ Lazer- MonaLisa Touch Claims

- A procedure that utilizes a carbon dioxide resurfacing laser to significantly improve the signs and symptoms of vaginal atrophy, laxity and stress urinary incontinence.
- In-office procedure and can be performed without the need of anesthesia with minimal no pain, downtime or side effects.
- Unlike other risky treatments available today, it is completely safe.

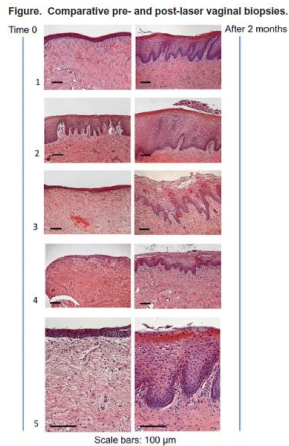


458

Comment > Menopause. 2019 Apr;26(4):338-340. doi: 10.1097/GME.0000000000001313.

Women harmed by vaginal laser for treatment of GSM—the latest casualties of fear and confusion surrounding hormone therapy

Andrew M Kaunitz ¹, JoAnn V Pinkerton ², JoAnn E Manson ³



SOGC CLINICAL PRACTICE GUIDELINE

No. 358, April 2018

No. 358-Intravaginal Laser for Genitourinary Syndrome of Menopause and Stress Urinary Incontinence

Recommendations

3. There is insufficient evidence to offer intravaginal laser therapy as an effective modality for the treatment of stress urinary incontinence over alternate management such as pelvic floor physiotherapy, incontinence pessaries, or surgery (Strong, Very Low).

Recommendations

4. Long-term use of intravaginal laser therapy for the management of genitourinary syndrome of menopause or stress urinary incontinence remains experimental and should remain within the protocols of well-executed clinical trials in attempts to establish its safety and efficacy (Strong, Very Low).



459

Mona Lisa: Gimmick or Gold?

- Data confirms utility for vaginal dryness but not to be used before vaginal estrogen or hyaluronic acid moisturizer.
- Invasive and questionable safety profile
- Needs to be administered by a physician
- Faulty claims made - **Gimmick**
 - Should not ever be used for SUI despite claims
 - Might have utility for certain clients with the complaint of vaginal dryness after first line strategies tried.



460

Virtual Care

- Virtual care has been defined as (CIHI):
 “any interaction between patients and/or members of their circle of care, occurring remotely, using any forms of communication or information technologies, with the aim of facilitating or maximizing the quality and effectiveness of patient care.”



461

Virtual Care - Recommendations

- Consultation for uncomplicated stress urinary incontinence can be used for women who are comfortable with this platform (**strong, low**)
- Although there is insufficient evidence to recommend virtual or telehealth consultation for routine pessary care instructions, these platforms can be considered on a case by case basis depending on the patient's comfort with pessary self-care (**conditional, very low**)



SOGC Technical Update
Technical Update No. 433: eHealth Solutions for Urinary Incontinence among Women

Sinad Dufour, PhD, [R](#), [RS](#), Aisling Clancy, MD, Maria Wu, MD.
 SOGC Urogynaecology Committee (2022), Baharak Amir, Aisling Clancy, Laura Didamazio,
 Sinad Dufour, Cathy Flood, Dobrochna Globerman, Manyse Larouche (co-chair), Oia Malabarey,
 Dante Pascali (co-chair), Maria Wu



462

Virtual Care Global Evidence

Case Reports > Physiother Theory Pract. 2023 Oct 3;39(10):2251-2261.
doi: 10.1080/09593985.2022.2069618. Epub 2022 Apr 28.

Telerehabilitation for persistent Pelvic Girdle Pain within a biopsychosocial framework - A case report

Małgorzata Starzec-Proserpio¹, Carolyn Vandyken²

Virtual care builds strong therapeutic relationships with patients through education, active listening, and shared decision-making.

Across a variety of related health sectors (urogynecology, msk health, psychology, pain care, cancer care, older adult) telehealth/virtual care found to be equal to in person care on client-based and therapeutic alliance-based outcomes and in some cases preferred.

> J Cancer Surviv. 2024 Mar 22. doi: 10.1007/s11764-024-01565-8. Online ahead of print.

Figure it out on your own: a mixed-method study on pelvic health survivorship care after gynecologic cancer treatments

Stéphanie Bernard^{1,2}, Ericka Wiebe^{3,4}, Alexandra Waters⁵, Sabrina Selmani⁵, Jill Turner⁴, Sinéad Dufour⁶, Puneeta Tandon⁷, Donna Pepin⁸, Margaret L. McNeely^{9,4}

> Urogynecology (Phila). 2023 Apr 24. doi: 10.1097/SPV.0000000000001359. Online ahead of print.

Older Patient Receptivity to the Integration of Patient Portals and Telehealth in Urogynecology: Promoters and Deterrents

Dani Zoorob¹, Yasmin Hasbini²



463

Virtual Care - Opportunity

- Hone in our cognitive intervention skills
- Building our motivational interviewing and health coaching muscles
- Develop confidence in integrating lifestyle interventions into our care plans
- Fine tuning our active listening skills and giving people space to tell their story in a safe space that is likely to cultivate future healing.
- Research base substantiates virtual care for MSK and Urogynecological care



464

Practice Guideline > J Obstet Gynaecol Can. 2022 Oct 20;S1701-2163(22)00671-5.
doi: 10.1016/j.jogc.2022.10.005. Online ahead of print.

Technical Update No. 433: eHealth Solutions for Urinary Incontinence among Women

Sinéad Dufour¹, Aisling Clancy², Maria Wu³; SOGC Urogynaecology Committee (2022); Baharak Amir, Aisling Clancy, Laura Didomizio, Sinéad Dufour, Cathy Flood, Dobrochna Globberman, Maryse Larouche, Ola Malabarey, Dante Pascali, Maria Wu

KEY MESSAGES

1. There are many emerging conservative care options in the form of electronic health and mobile health technologies to help women manage urinary incontinence.
2. Several eHealth and mHealth options have demonstrated usefulness and benefit for women with urinary incontinence, particularly stress urinary incontinence.
3. The most useful electronic health and mobile health tools are those based on principles of self-management support (motivational strategies to support behaviour change) or those that are used in conjunction with such an approach.
4. Telehealth platforms enable conservative care for urinary incontinence, including surgical counselling for stress urinary incontinence.



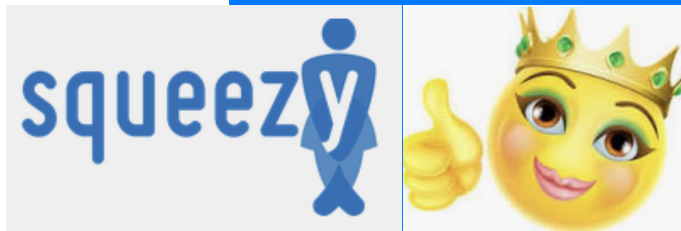
465

Participant Takeaways

- eHealth and mHealth options growing fast
 - several are justified to overcome care barriers
 - HCP involvement is GOLD!
- most useful tools are based on motivational strategies to support behaviour change and evidence-based PFMT principles.
- claims made about technologies need to be separated from the mechanisms and clinical evidence
 - don't confuse the "what" with the "how"
 - beware of imitators - self and clinic applied
- virtual care holds value in the landscape of pelvic health
 - best practices require further study to optimally guide practice



466



467

A vertical blue banner. The top half features a circular portrait of a smiling woman with blonde hair. The bottom half features the Pelvicon logo, a white line-art illustration of a female pelvis with the word 'PELVICON' written in white capital letters below it.

468

Thank You

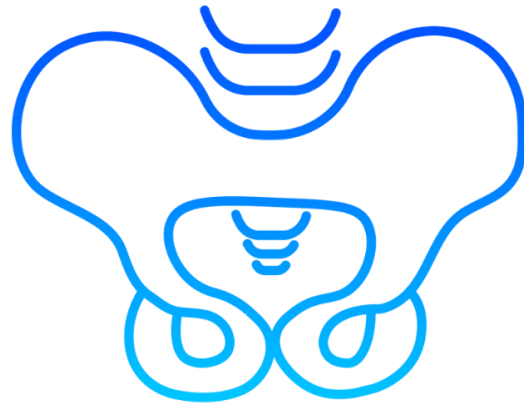


Questions?



Sinead Dufour, PT PhD
sdufour@mcmaster.ca





P E L V I C O N

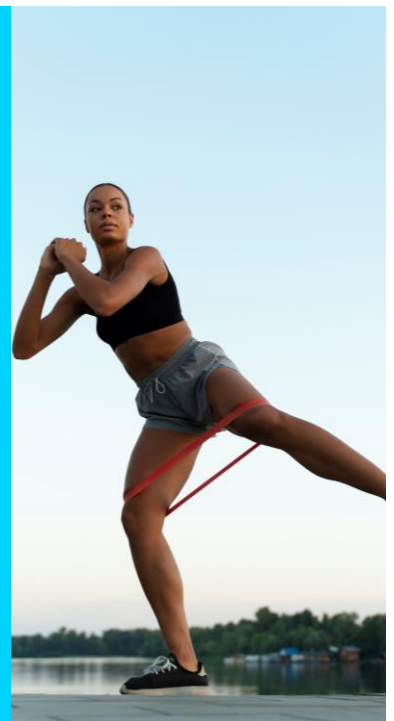
469

My patient still leaks! What now? Clinical realities for supporting female return to sport

Gráinne Donnelly



P E L V I C O N



470

Equality, diversity, belonging disclosure

The contents of this presentation refer to symptomatic persons who are biologically assigned female at birth.

Terms relating to female and woman/women are used to be consistent with the research source they are extracted from and are intended to be inclusive of, and applicable to, all persons with biologically assigned female sex, regardless of gender identity.



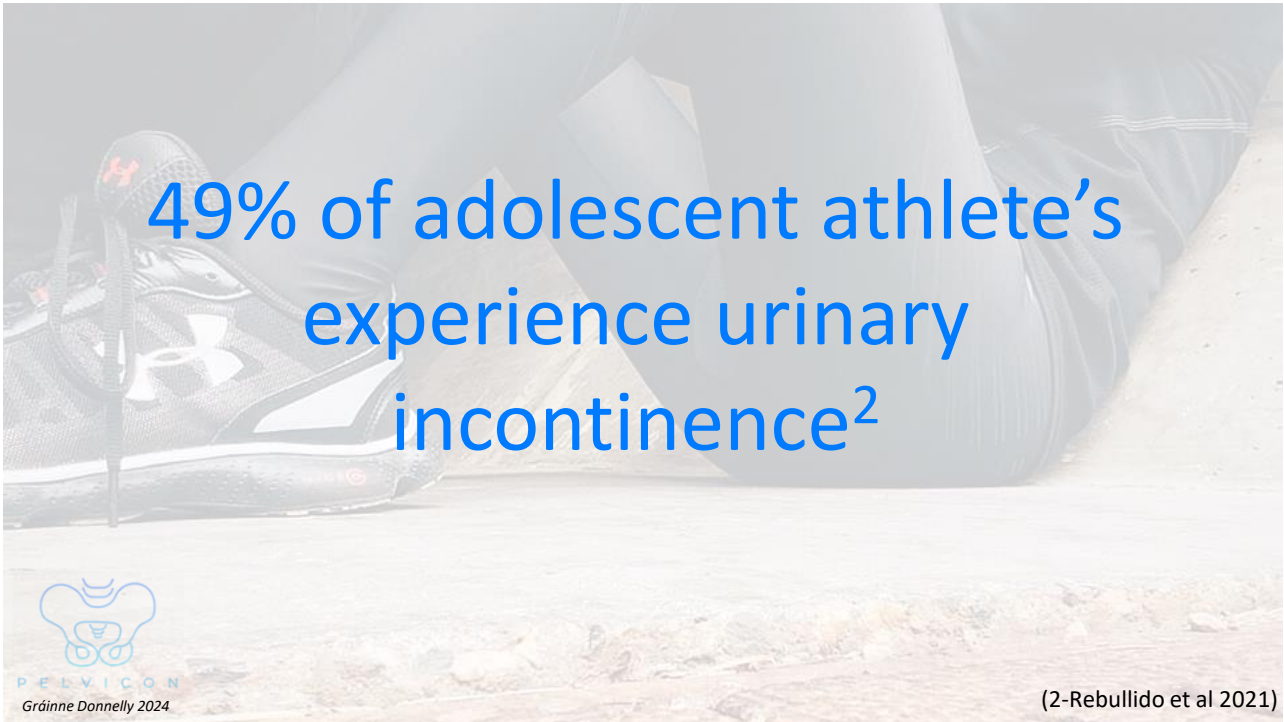
473

Athletes are at a 177%
higher risk of experiencing
SUI symptoms compared to
sedentary women¹




474

(1- Ron et al 2024)



49% of adolescent athlete's experience urinary incontinence²



Gráinne Donnelly 2024

(2-Rebullido et al 2021)

475

Have you ever had a patient that you couldn't get better?



Gráinne Donnelly 2024

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477

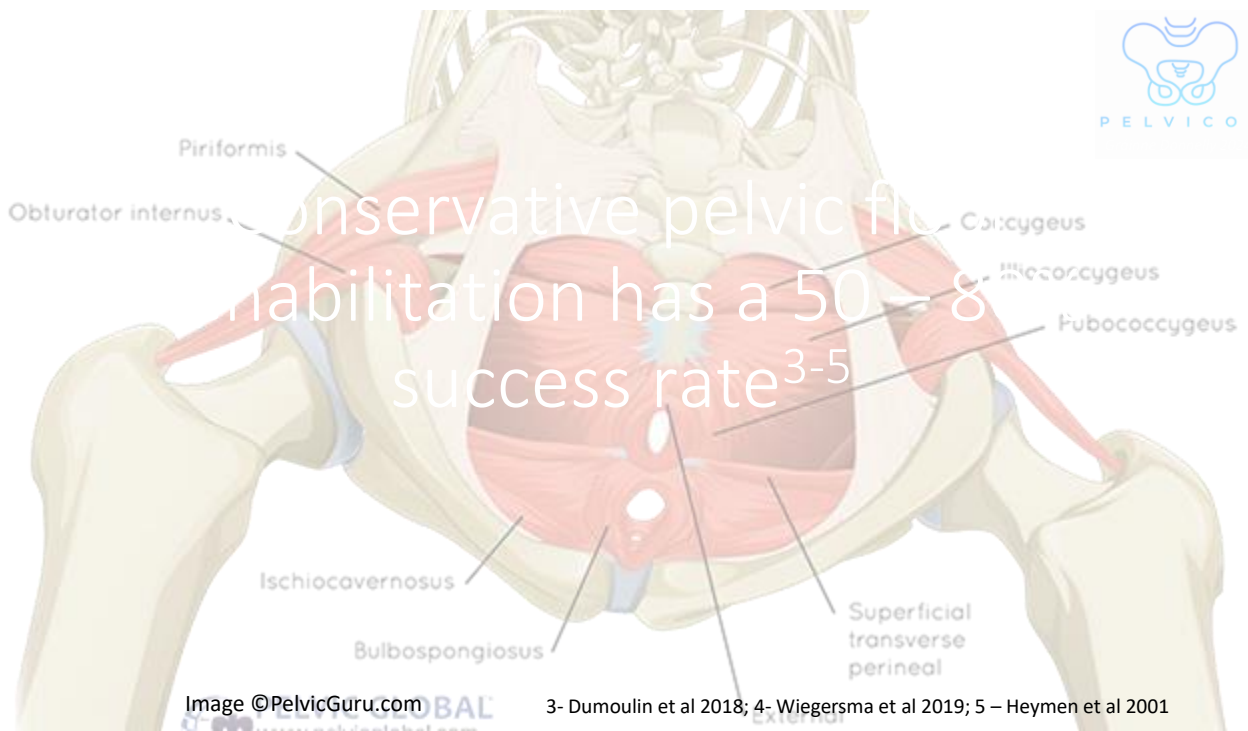


Image ©PelvicGuru.com

3- Dumoulin et al 2018; 4- Wiegiersma et al 2019; 5 – Heymen et al 2001

478

Factors which may limit rehabilitation success

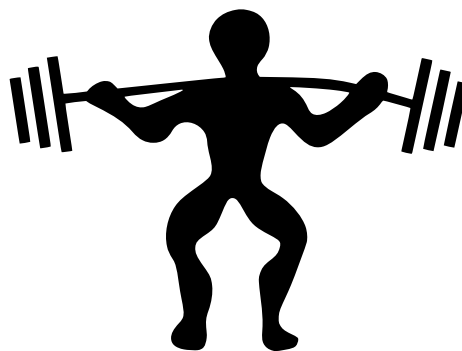
- Functional reserve of the pelvic floor⁶



479

Factors which may limit rehabilitation success

- Functional reserve of the pelvic floor⁶
- Inciting and intervening factors in an athletes life^{7,8}



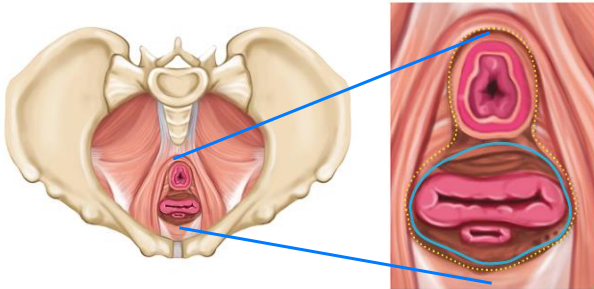
Gráinne Donnelly 2024

(6 – DeLancey et al 2008; 7 – DeLancey et al 2024; Bø & Sundgot-Borgen 2010)

480

Factors which may limit rehabilitation success

- Functional reserve of the pelvic floor⁶
- Inciting and intervening factors in an athletes life^{7,8}
- Connective tissue integrity⁷

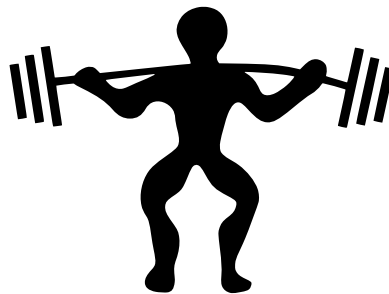


(6 – DeLancey et al 2008; 7 – DeLancey et al 2024; 8 - Bø & Sundgot-Borgen 2010; Carley & Chaffer 2000)

481

Factors which may limit rehabilitation success

- Functional reserve of the pelvic floor⁶
- Inciting and intervening factors in an athletes life^{7,8}
- Connective tissue integrity⁷
- Load demands of athlete lifestyle and sport^{9,10}

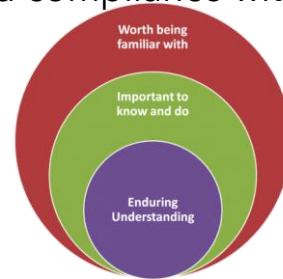
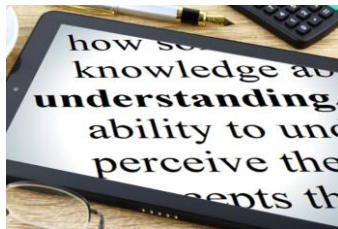


(6 – DeLancey et al 2008; 7 – DeLancey et al 2024; 8 - Bø & Sundgot-Borgen 2010; 9 - Donnelly et al 2024; 10 - Gabbett 2020)

482

Factors which may limit rehabilitation success

- Functional reserve of the pelvic floor⁶
- Inciting and intervening factors in an athletes life^{7,8}
- Connective tissue integrity⁷
- Load demands of athlete lifestyle and sport^{9,10}
- Athlete understanding, engagement and compliance with rehab¹¹



PELVICON
Gráinne Donnelly 2024

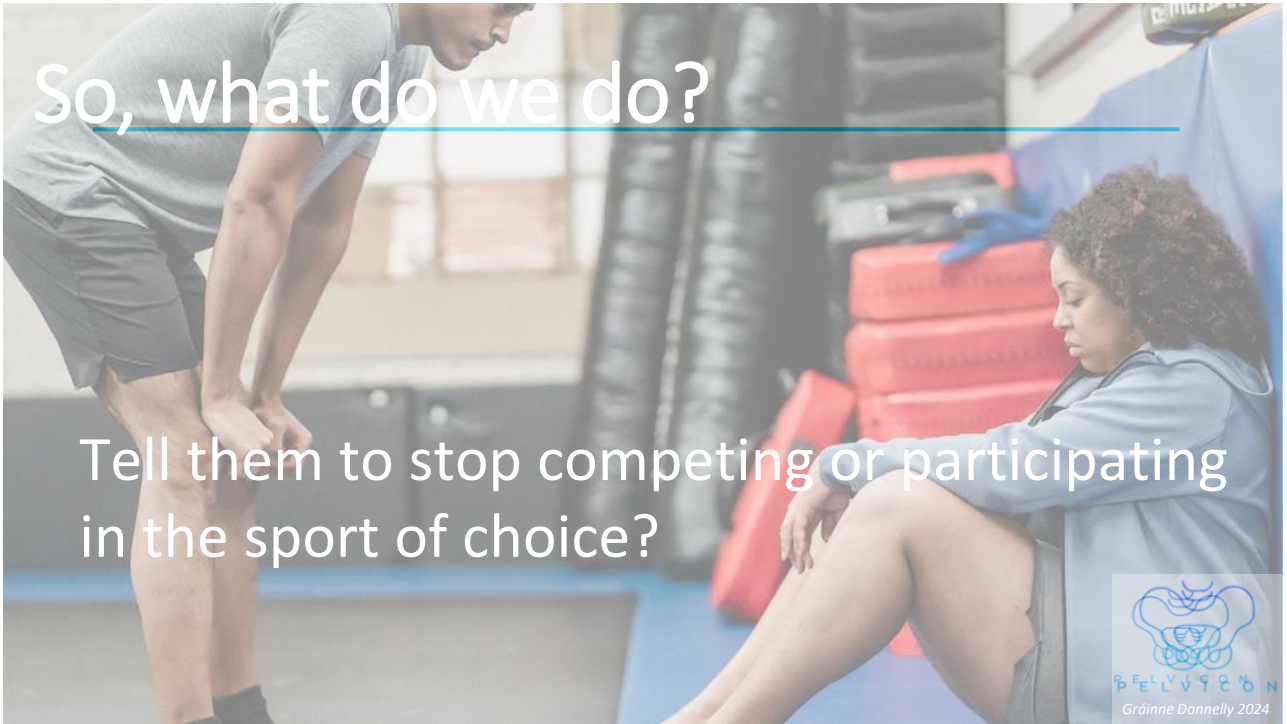
(6 – DeLancey et al 2008; 7 – DeLancey et al 2024; 8 - Bø & Sundgot-Borgen 2010; 9 - Donnelly et al 2024; 10 - Gabbett 2020; 11 - Marshall et al 2012)

483

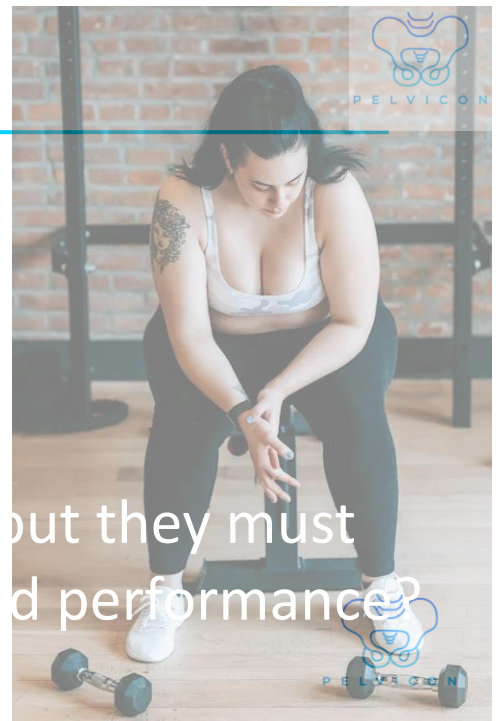


PELVICON
PELVICON

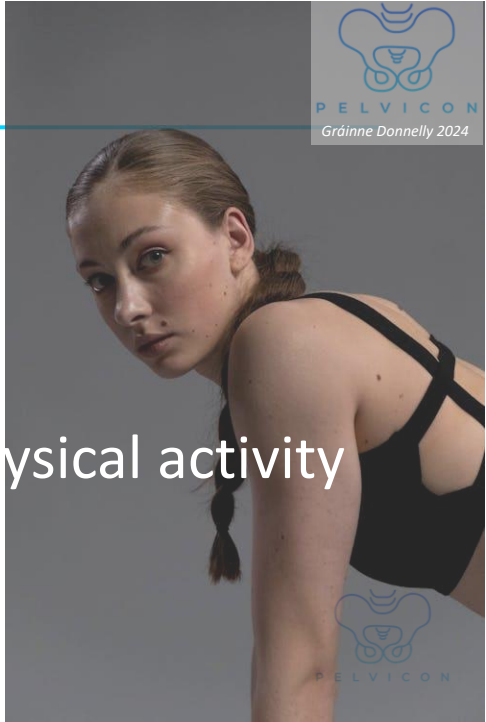
484



485



486



487



Was Odell Beckham Jr told his career was over after significant ACL tear???



488

Image source: Mass General Brigham

What about Morgan Stickney, a competitive freestyle swimmer as a teen who underwent a bilateral lower limb amputation?



489



490

Let's talk smart!^{9,12}

Consider the risks versus benefits of continuing/returning to sport when still PFD symptomatic

Has rehabilitation been maximised?

What strategies are worth trying?

Consider cumulative loads?

What adjuncts are available?

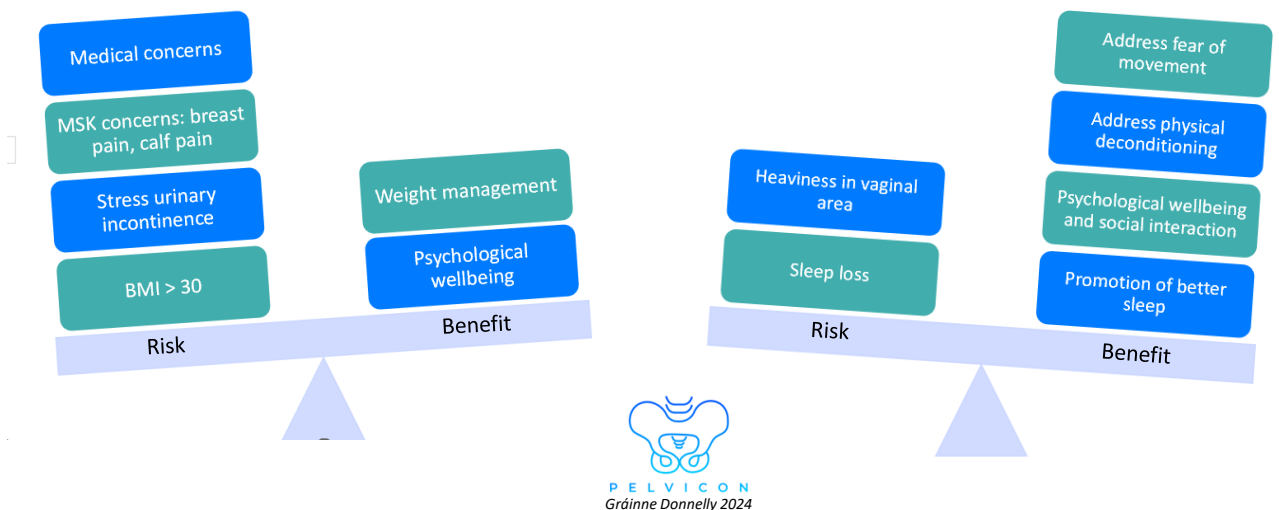
What else for the symptomatic athlete?



(9 - Donnelly et al 2024; 12 - Giagio & Donnelly *under review*)

491

Risk - Benefit Analysis for participating in sport



492

How do we determine if continuing or returning to exercise is safe?

- Is engaging in this exercise and provoking symptoms going to progress symptoms and dysfunction?
- Is engaging in this exercises dangerous or harmful to overall health? Are there any red flags¹³
- Is not engaging in this exercise dangerous or harmful to overall health?

(13 - Donnelly et al 2023)

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Case Scenario

- 26-year-old nulliparous rugby player
- C/o urinary incontinence during forceful movements (tackling, scrum)
- Also leaking during sudden change of direction and sprinting
- Impacting performance, feels she is holding back
- Embarrassed, she only knows older women who leak
- Worried about leaking down leg and others seeing
- Emptying bladder several times before training/matches and during half time, restricting fluids, sometimes wears a tampon as it seems to lessen leakage
- BMI - 31 kg·m⁻²
- Hypermobility syndrome



494

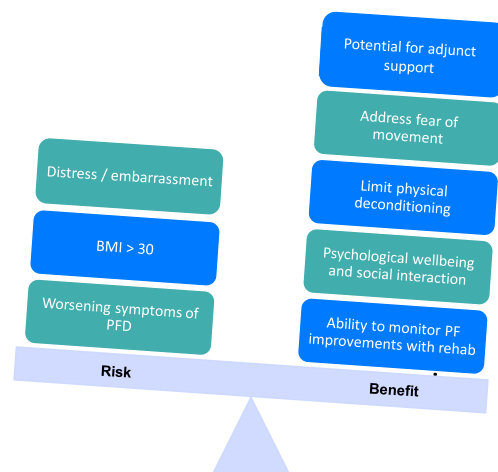
Case Scenario

- **Engaged in pelvic floor physical therapy** with **minimal improvement** in symptoms
- Pelvic health clinician found that pelvic floor muscle ROM and strength (force) measured via modified Oxford MMT scale were good ~ grade 4, 10 second sustained hold
- Transperineal ultrasound demonstrated **urethral hypermobility**
- Knack reduced mobility of urethra during Valsalva and cough



495

Risk benefit analysis for returning continuing to play

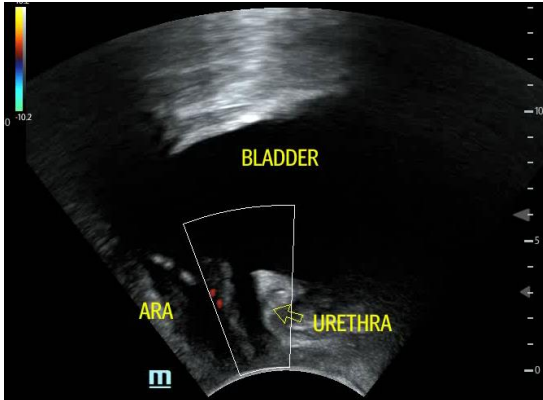


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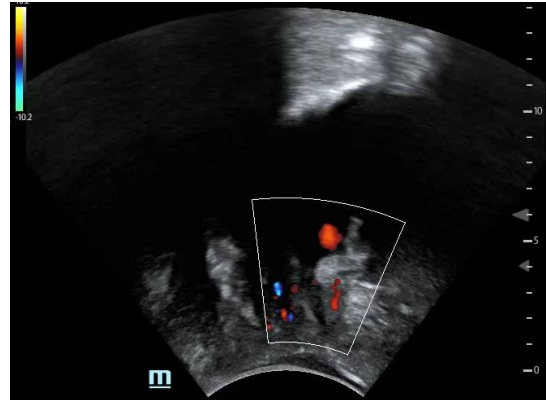
Urethral mobility



Normal continence mechanism

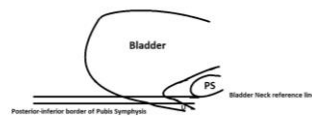
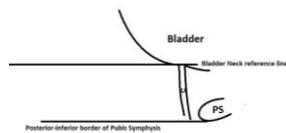
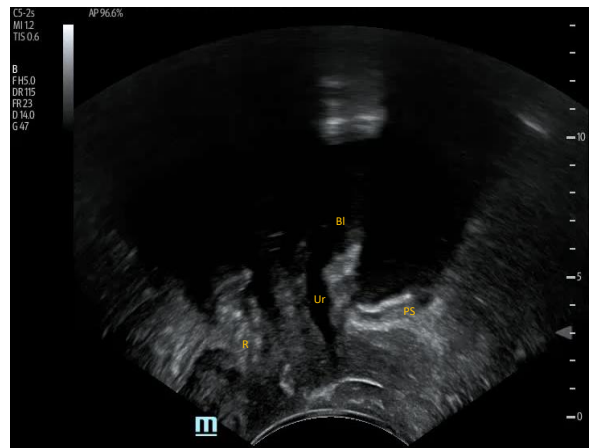
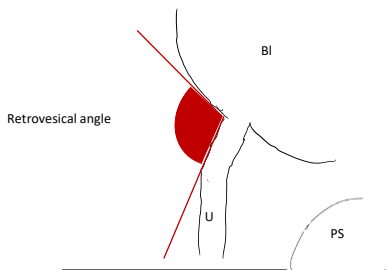


Compromised continence mechanism



497

Urethral mobility



498

Has rehabilitation been maximized?

- Has PFMT achieved *specificity, overload, progression*?
- Athlete understanding and adherence?
- Other factors that may influence success of PFMT (REDs¹⁴; constipation; connective tissue support*).

(14 – Mountjoy et al 2023)

499



Strategies for managing PFD⁹



European Journal of Sport Science
The Official Journal of the European College of Sport Science

Open Access

REVIEW | Open Access |

Up for the tackle? The pelvic floor and rugby. A review

G. M. Donnelly K. Bø, L. B. Forner, A. Rankin, I. S. Moore

7 PELVIC FLOOR STRATEGIES FOR RUGBY PLAYERS

How different players tolerate the same PFM load may be explained by predisposing, inciting and intervening factors (Delancey et al., 2008; DeLancey et al., 2023) discussed earlier in this review. For example, variation in player tolerance may also be relative to the functional reserve each player achieved during growth and development (Delancey et al., 2008). Players who progress to superior PFM strength and tolerance to load during earlier life are likely to have more functional reserve and resilience to inciting (pregnancy and childbirth) and intervening (lifestyle and age-related decline) factors which increase the risk of PFD. Further, player strategies employed during rugby may add to the combination factors influencing a player's risk including behavioral and non-behavioral strategies.

7.1 Behavioral strategies

Symptoms of PFD suggest that a player is not tolerating the load being placed upon the PFM, yet many players continue to play when experiencing symptoms (McCarthy-Ryan

(9 - Donnelly et al 2024)

500

Breathing

- Paucity of evidence and conflicting opinions regarding the influence of breathing and PFD¹⁵
- Clinical experience:
 - stress/tension reduction
 - ? Pelvic floor relaxation through ROM
 - ability to locate and connect to PF
- Nuances of the Valsalva technique¹⁶



Gráinne Donnelly 2024



(15 – Bø et al 2023; 16 - Prett & Moore 2024)

501

The central diagram is a circular hub-and-spoke model with a runner icon in the center. The surrounding nodes include:

- Musculoskeletal
- Physical Deconditioning
- Changes to Body Mass
- Sleeping Patterns
- Breastfeeding
- RED-S*
- PP Fatigue & Thyroid**
- SE*** Considerations
- Fear of Movement
- Psychological Wellbeing

Whole-systems¹⁷

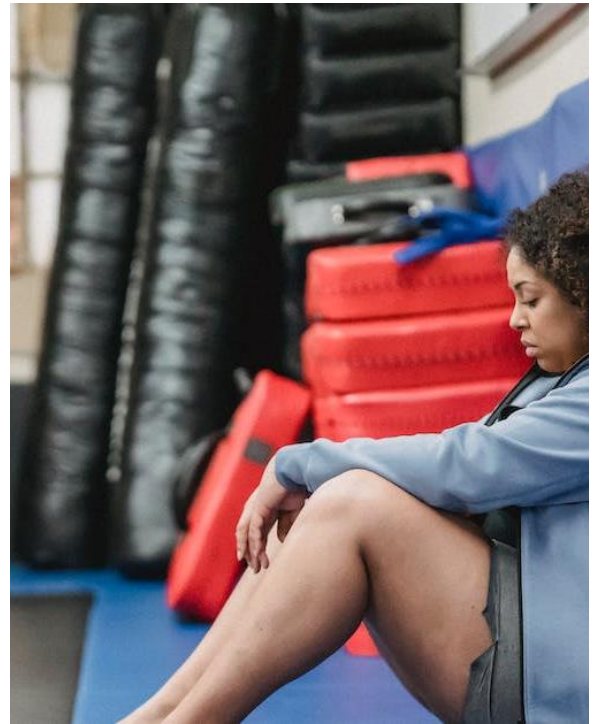
(17- Donnelly et al 2022)

502



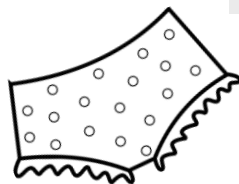
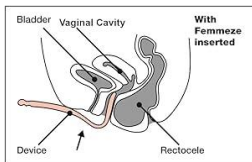
Training environment

- Changing and toilet facilities?
- How far away/easy to get to?
- Access to products
- Approachable support team?
- Flexibility around role as a mother?



503

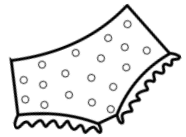
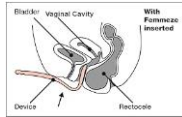
Pelvic floor adjuncts



504

Pelvic floor adjuncts

- Vaginal support pessaries
- Urethral support devices
- Continence products for bladder and bowel
- The hailed footstool
- Vaginal splinting aids
- Rectal irrigation devices
- SheWee!!!
- ...and many more



505

Our smart ancestors also used adjuncts

- Records of Roman and Egyptian women utilising strategies and products to support pelvic organs are well documented¹⁸
- Evolution of the role of pessaries¹⁹

(18 – Oliver et al 2011; 19 – Shah et al 2006)

Image © Academic Technology Services; published
SCIENCE ADVANCES 64(45) 2020 – PERMISSION FROM AUTHOR TO USE



506

Contemporary pessary science²⁰

Do pessaries offer a prophylactic role?

Restifem pessary trial - n=857 postpartum women recruited. Pessary intervention from 6 weeks postpartum. Reviewed at 8 weeks, 3 months, 6 months via online questionnaire.

Dropout high – n=119 used the pessary (14%), ↓ to n=85 (3mnts) and n=38 (6mnts).

Of those who used intervention only 31% adherence to 6 months

...findings limited



(20- Keifner et al 2023)

507

Compression garments



508

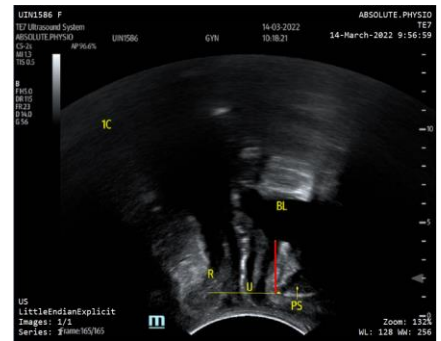
Compression garments²¹

- Compression garments often used in elite performance sports (particularly male)
- Conflicting research regarding their impact on sports performance
- Supporting research for their role in muscle recovery by reducing oscillation in muscles
- Targeted compression garments to the pelvic floor are a relatively new concept. Anecdotal evidence that they reduce leaking and symptoms of prolapse and help women have the confidence to exercise
- But is there any mechanical impact over and above placebo?

(21- Weakley et al 2022)

509

510



511

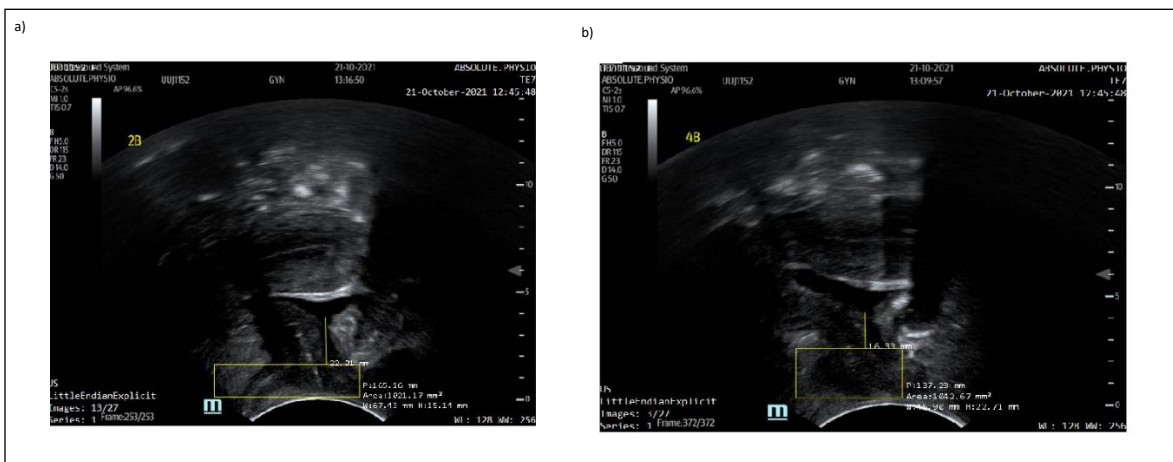


Figure 3 – a) example of participant data demonstrating higher bladder neck height when wearing the compression garment (2B) versus b) not wearing the compression garment (4B)



© G Donnelly 2024

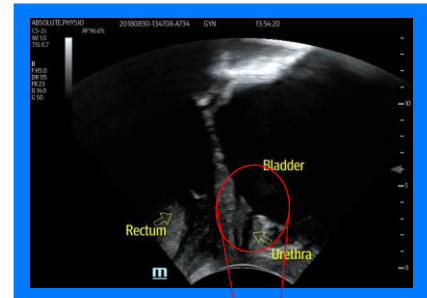
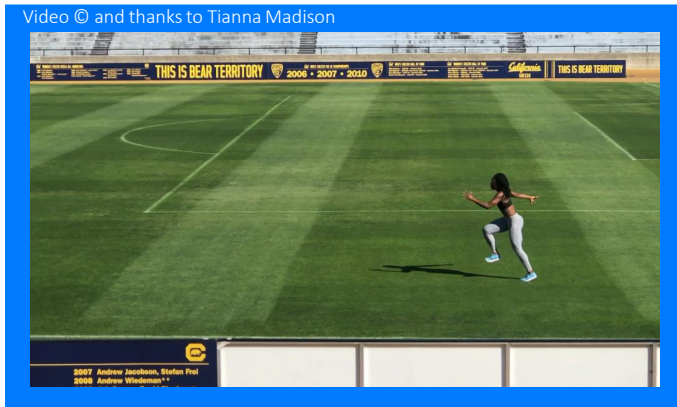
512



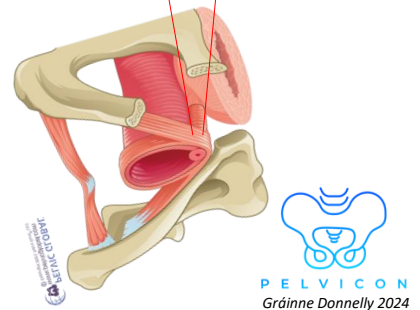
	Mean	Std. Deviation	N
BND Crook	7.2mm	5.5	20
BND Crook with CG	5.5mm	5.8	20
BND Stand	8.8mm	7.6	20
BND Stand with CG	7.4mm	6.7	20



513



The balance of mobility and stability, P Hodges 2021, ICS Podcast²⁴
 Factors influencing PFD – Pelvic rehab myth busting, Celebrate Muliebrity Podcast²⁵

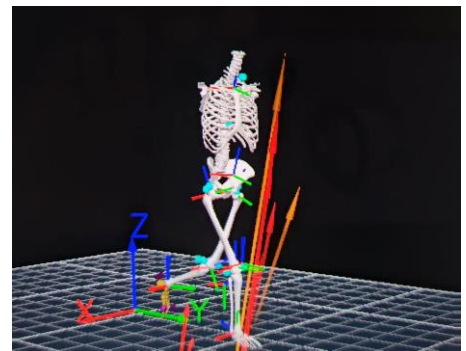
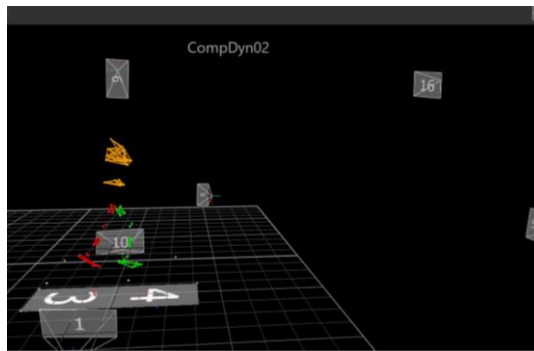


514

Running mechanics study



- Do compression garments influence running mechanics?
- N=13 symptomatic postpartum females repeated measures design
- Pelvic floor, perceptual, kinematic, spatiotemporal and force data
- Self-selected speed, randomised conditions



515



Early research insights: perception



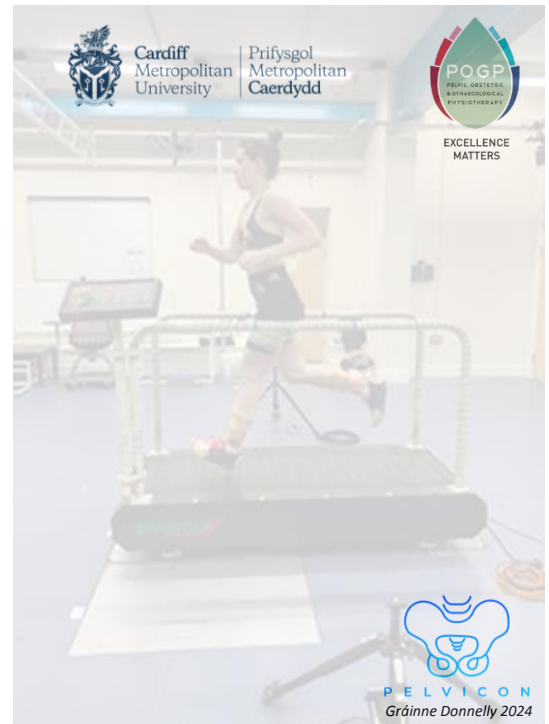
Question	Wearing CG
How supportive to your pelvic floor do you find the shorts that you are currently wearing?	P<0.001
How supportive to your core do you find the shorts that you are currently wearing	P<0.001
How fearful do you feel of experiencing symptoms of PFD in the shorts you are currently wearing?	P<0.009



516

Preliminary Kinetic insights

- ↓ Peak Pelvis Jerk Vertical $p= 0.05$
- ↓ Peak Pelvis Jerk Resultant $p = 0.02$
- ↓ Culminative Pelvis force $p= 0.03$
- ↑ Power Pelvis Low $p=0.00$
- ↑ Power Pelvis High $p<0.001$
- ↑ Shock Attenuation $p = 0.04$
- ↓ Peak Pelvis Resultant $p=0.009$



517



518

Next step interventions^{12,13}

What are the options? (medication, bulking agents, surgery)

What are the success rates/risks/benefits of available options

Is time-loss from sports necessary to access/recover from next step intervention?

Interdisciplinary athlete centred decision making



(12 - Giagio & Donnelly under review 13; - Donnelly et al 2023)

519

Key take-aways

- Stop telling athletes they can't...
- Risk assess!
- Explore adjuncts to support pelvic floor function
- Consider strategies that may be useful
- Keep athletes active!

Got it!!!

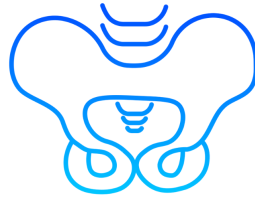


IG: @absolute.physio

X: @ABSPhyio

520

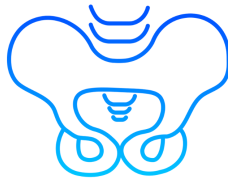
Q&A



P E L V I C O N

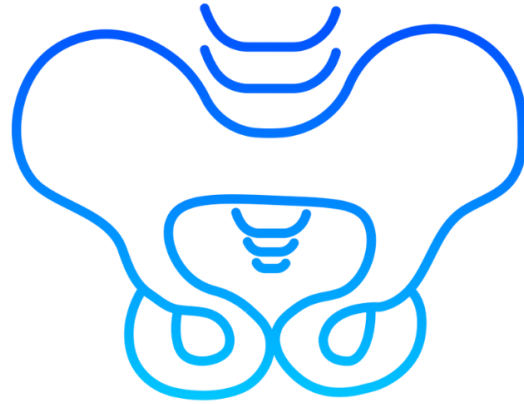
521

Giveaway!



P E L V I C O N

522



P E L V I C O N

523

The Nuts & Bolts of Prostate Cancer: Pre & Post Rehabilitation- Maximizing Outcomes

Dr Jo Milios (PhD)



P E L V I C O N



524



Jo Milios



About Me

- 32-hour flight from Perth, Western Australia to Atlanta Georgia, USA
- Started life as a classical ballet dancer
- Scoliosis got in the way - career curve
- Physiotherapist 1994-2024 Private Practice - Musculoskeletal & Men's Pelvic Health
- PhD - 2012 -2019 University of WA
- Passionate about education, family & yoga
- I declare no financial / product affiliations

525

Gino's Prostate Cancer Story



- 4/12 Post- Radical Prostatectomy - nil PFM preparation
- Depressed, house-bound, isolated, 6 pads per day, impotent
- Wife contacted me via email via PCFA - nowhere to go
- Reviewed Gino - physio- commenced on High Intensity PFM
- Within 4 weeks, pad free and socialising again
- Referred to Sexual Health Physician
- Linked up with CFA - BINS4BLOKES campaign, launched 2021
- 2024 - Full recovery continues, cancer free, pad free, sexually active

Never too late to commence
-75%
recover in 3 months!!



526

Maximizing Gino's Goals of Treatment:

Prepare Gino:

- Physically
- Psychologically
- Emotionally
- Socially
- Realistic Expectations
- Anticipated Timeframes

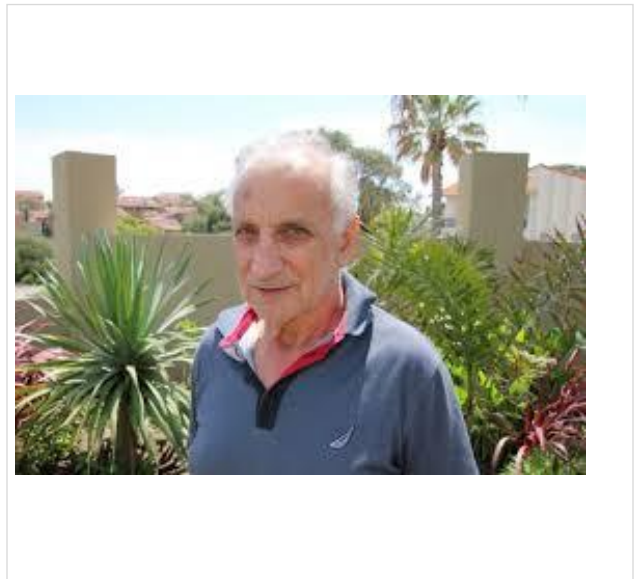


527

Maximizing Gino's Goals of Treatment:

Build a team around him:

- Urologist
- Urology Nurse
- Prostate Cancer Nurse
- Sexual Health Therapy
- Exercise Physiologist
- Psychologist



528

Prehabilitation Strategies begin Day 1

Since 2005, Men's Health Physiotherapy - patient feedback
(Based on >5 000 Radical Prostatectomy patients):

- Men feel **SHAME** when it comes to 'private parts'
- Attending an appointment is a **MASSIVE** act of **COURAGE**
- Men are **ACTION** oriented, want a plan and a result
- **Any change to their continence or sexual function GREATLY impacts on self-esteem & relationships**
- Refer on sooner vs later - e.g. urodynamics

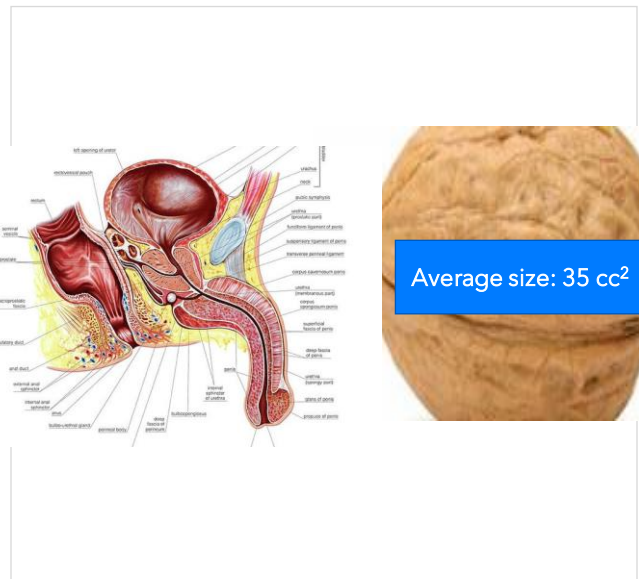


529

The Prostate & Pelvic Anatomy

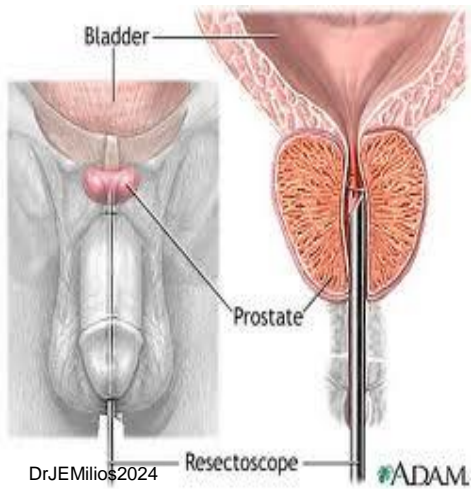
Education:

- A walnut sized gland (35cc)
- Vital for fertility
- Enlarges as men age, at 10% / decade
- Makes prostatic fluid to carry semen
- Provides nutrition to sperm

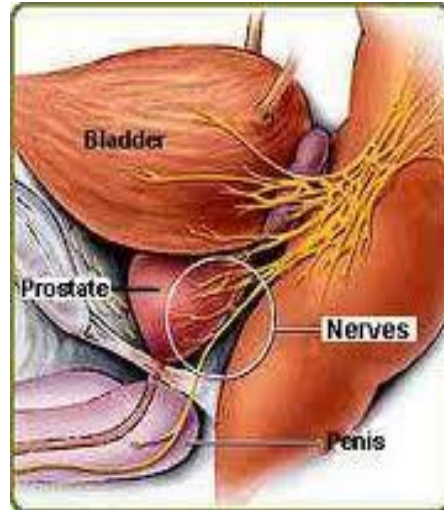


530

AMAB Anatomy & Nerve Supply



BIG PICTURE

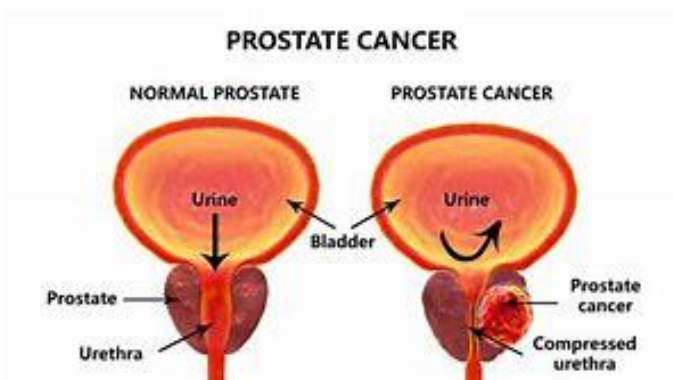


CLOSE UP



531

A little background on Prostate Cancer (PCa)



Aggregation of abnormal cells
in the prostate gland



532

Global Prostate Cancer Incidence

Prostate cancer incidence: HIGH ■ MEDIUM HIGH ■ MEDIUM ■ LOW ■



1.42 million new cases/ year globally
375,000 deaths annually .1.Cancer.net.statistics 2024



533

Prostate Cancer (PCa) Risk Factors



- 1 in 6 men are diagnosed with prostate cancer <75 years
- 1 in 8 women are diagnosed with breast cancer <75 years
- 1 in 2 men at risk of PCa if there is a positive family history on the male side / genetic lineage
- 1 in 4 men if breast, ovarian or uterine cancer on female side due to BrC2a gene
- 1 in 4 men under 85 will be diagnosed with PCa in their lifetime
- Alcohol, African-American race, BMI > 33, past testosterone therapy, diabetes, cardiovascular disease

534

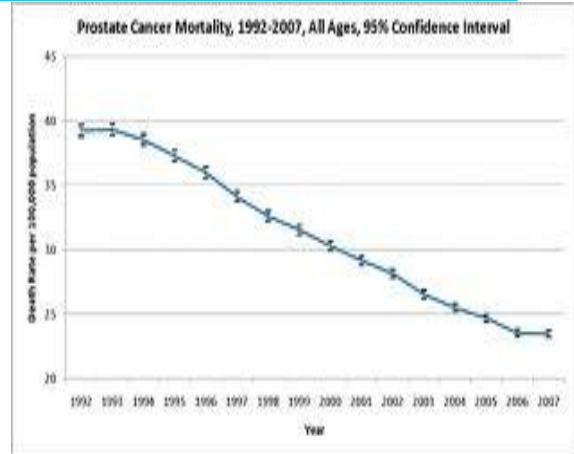
PSA Guidelines and Statistics

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Table 1: Age-Adjusted PSA Reference Range Data

Age group	Median PSA levels	Range*
< 40 years	0.52 ng/mL	0.19 - 1.3 ng/mL
40 to 49 years	0.65 ng/mL	0.22 - 1.6 ng/mL
50 to 59 years	0.80 ng/mL	0.25 - 2.6 ng/mL
60 to 69 years	1.2 ng/mL	0.29 - 5.6 ng/mL

* Central 95th percentile of normal reference values for that age group (data from reference 11)



PCa 5 year relative survival: >97%
 PCa 10 year survival rate >95%
 PCa 15 year survival rate > 90%

2. www.cdc.gov-cancer-statistics 2018



535



USA PCa Incidence

- 2023 – Estimated PCa to be 14.7% of all new cancer cases
 - Estimated new cases in 2023 = 288, 300
 - 5.7% of all cancer deaths
 - Estimated deaths in 2023 – 34,700
- Second most common cause of death from cancer among white, African American, American Indian/Alaska Native, and Hispanic men
- In 2020 estimated 3,343,976 men living with PCa in USA
- 2.5 mil males live with Pca diagnosis in USA
- www.cdc.gov-cancer-statistics



536

Recommended Tests for PCa diagnosis

1. PSA Blood Test
2. DRE Digital Rectal Exam

Prostate Specific Antigen (PSA)

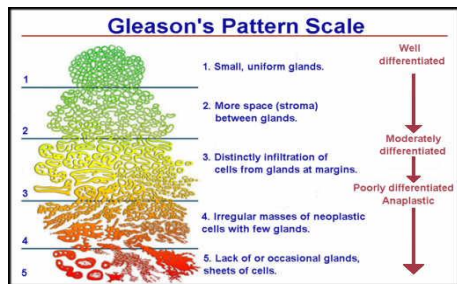
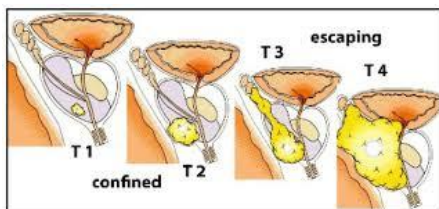
3. Multiparametric MRI
4. Targeted Biopsy

TransPerineal Biopsy



537

Gleason Score 7-10 HIGH
Gleason Score 2-6 LOW



Classification of PCa

TNM system: Tumour/Nodal/Metastatic ranks between 1-4 , 2 scores out of 5 are combined

Gleason Score : 2-10 + TNM score : Nodes

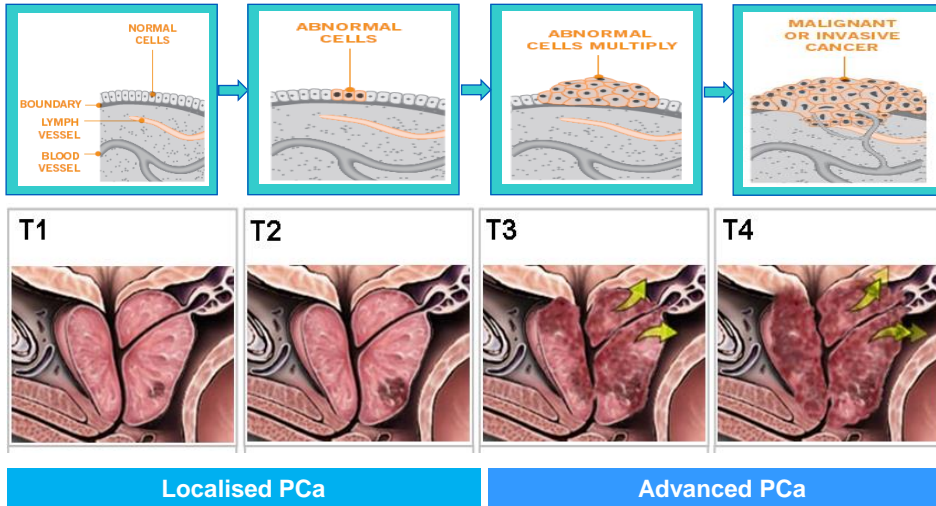
The biopsy Gleason Score is the sum of the primary grade (major tumour; > 50% of the total pattern) PLUS secondary grade (minor tumour; < 50% but > 5% of the total pattern), between 2-10, >6 needs treatment.

Combination of both assessments determines Prognosis & Course of treatment



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Prostate Cancer Pathology



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Local vs Advanced PCa treatment

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Type	Management or treatment options
Localised	Usually offered active surveillance, surgery or radiotherapy. Watchful waiting may be an option.
Locally advanced	Active surveillance is not recommended and you will be offered surgery and/or radiotherapy. Androgen deprivation therapy may also be suggested.
Advanced/metastatic (at diagnosis)	Usually offered androgen deprivation therapy. Chemotherapy may also be suggested initially. Watchful waiting may be an option.

- Local PCa treatment goals
- Minimise spread of PCa
- Curative intent
- Normal life expectancy



- Advanced PCa treatment goals
- Quality of life
- Palliative care
- 1-5 year life expectancy



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Common Prostate Cancer Treatments

Localised PCa

- Active Surveillance- regular PSA & biopsies
- Surgery- Radical Prostatectomy (RP)
 - Open Abdominal RP (ORP)
 - Laparoscopic RP (LRP)
 - Robotic-Assisted (RARP)
 - ? **Non, Bilateral or Unilateral Caverosal Nerve Sparing for preservation of sexual function**
- Radiation- External Beam Radiation Therapy (EBRT)
- Cyberknife - surgical radiation locally lymph nodes, spinal metastases, prostate bed
- Brachytherapy - radioactive seeds, less common
- Nanoknife , Proton Beam Therapy

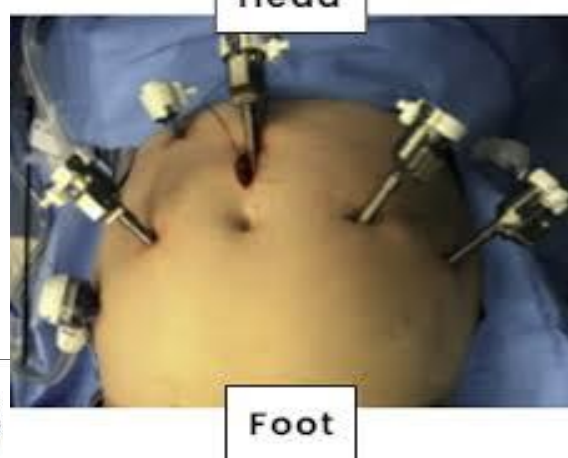
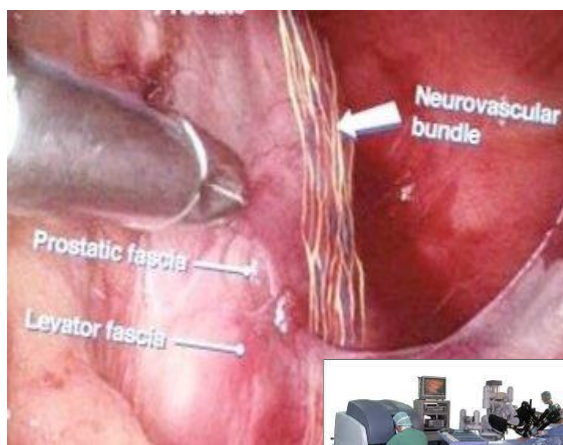
Advanced PCa

- Chemotherapy - oral and intravenous
- Immunotherapy - emerging
- Androgen Deprivation Therapy (ADT)
- EBRT
- Cyberknife to affected focal sites e.g. hip, lymph



541

Robot- Assisted Radical Prostatectomy (RARP)



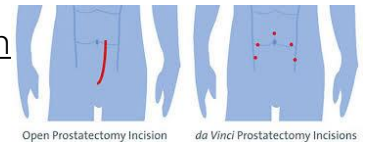
542

Surgery: Open Vs Robotic Radical Prostatectomy

- Landmark world's first RCT comparing 'Open' vs 'RALP' presented at Asia-Pacific Prostate Cancer Conference 2016 & 2018
- N = 326, 163/group assessed at 6 wks., 3 months, and 12 months with EPIC-IC, SF36, HADS Depression
- 1 surgeon each group, experienced ORP vs new RALP surgeon

Results:

- No difference in continence or erectile function
- Less blood loss, hospital stay, pain



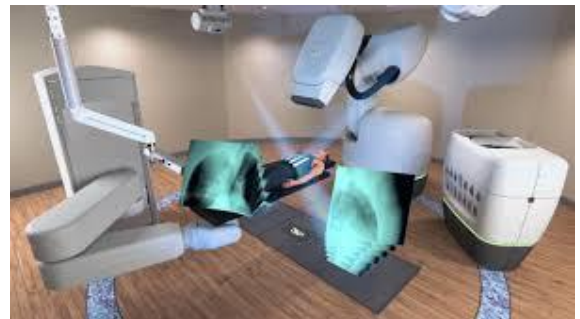
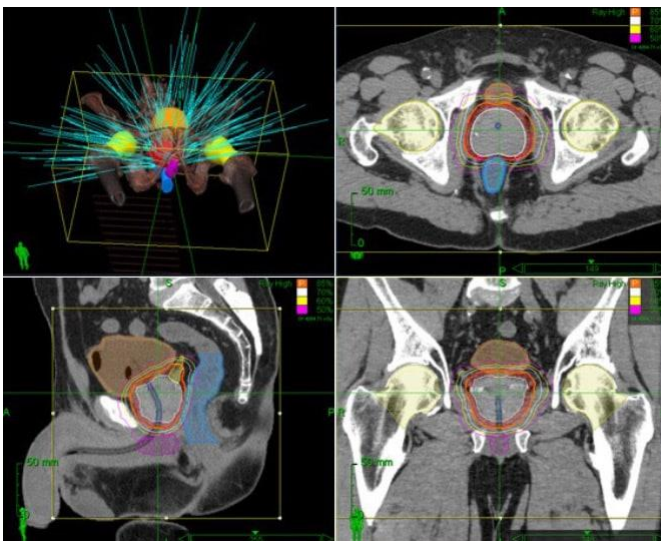
Conclusion: Rapport and skill of surgeon BEST indicators

4.Yaxley JW, Coughlin GD, 2016 The Lancet Vol 388 Issue 10049 P1057-664



543

Cyberknife – Surgical Radiation- High Grade Focal Therapy

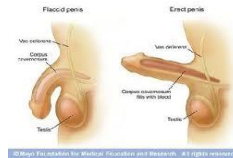


544

Physical side effects of treatment are **UNIQUE** to each man



1. Incontinence affects up to 80-98% men
5. Hodges et al 2019



2. Erectile dysfunction affects 68-98% men
6. Nelson J Sex Med 2013



3. Peyronie's disease
16% men after RP
12% men after EBRT
7. Tal 2017

RADIATION SIDE EFFECTS are **UNDER-EDUCATED, UNDER-INFORMED,** and **TREATMENT REGRET** is more likely

- 4. Bowel Dysfunction— potentially affects men undergoing radiation, Cyberknife, ADT &/ or chemotherapy of any type

Symptoms include diarrhoea, constipation, faecal incontinence (FI), Bleeding, Proctalgia, Prostatitis, CPPS/ Pudendal Pain

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Men are in despair unnecessarily.....& there is a **72%** increased suicide with a PCa diagnosis



From clinical experience - any man not having the opportunity to PREHAB takes 6-12 months to improve, is often depressed and not adherent, desirous or compliant to penile rehab whilst he is 'wet'....



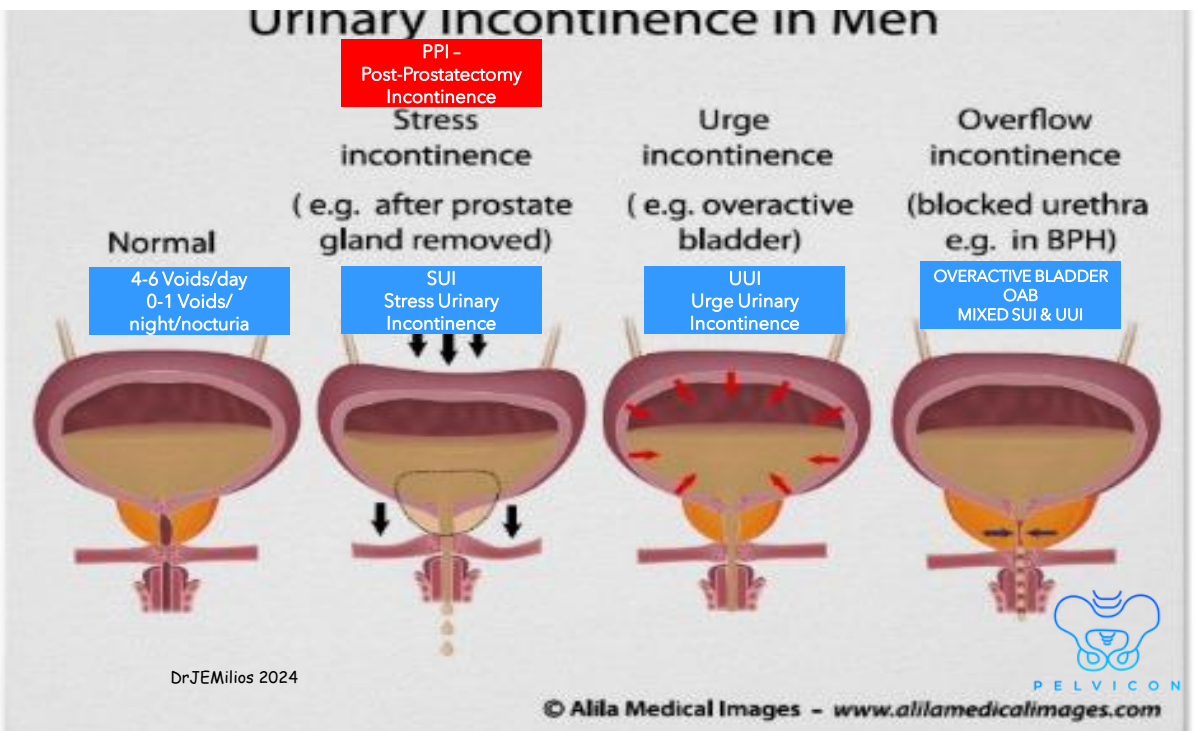
546

MEN'S HEALTH PHYSIOTHERAPY

Post-Prostatectomy Urinary Incontinence (PPUI/PPI)



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Impact of Incontinence on Australia Men

A 2013 study of Australian men with urinary incontinence found:
www.cfa.org.au

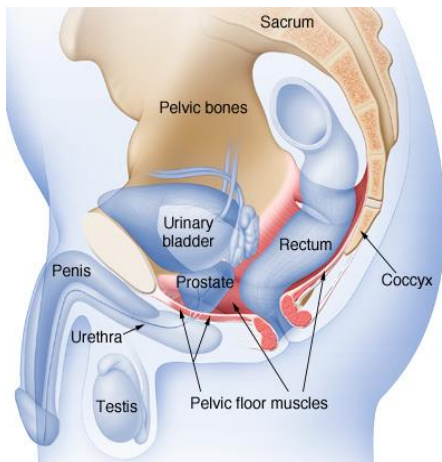
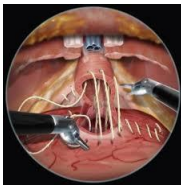
- 57% of men intentionally kept accidents secret from those close to them
- 50% avoided situations where they could not access a toilet easily
- 28% avoid socialising, except with close family and friends
- 76% of men actively located toilets when arriving at an unfamiliar place
- 47% of men reported they avoid situations where they were likely to leak
- 27% of men stated they stayed at home as a precautionary measure



8. McKenzie S, St John W, Wallis M, Griffiths S. Men's management of urinary incontinence in daily living: implications for practice. *International Journal of Urological Nursing*. 2013 7(1):43-52.

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Causes of PPI/ UI

- Internal urethral sphincter (IUS) / bladder is surgically joined to external urethral sphincter (EUS)/SUS
- Long bladder neck vs short -12mm minimal to stabilise
- 7-21 days of catheterisation
- Smooth (IUS) vs striated (EUS) muscle
- EUS within PFM is weak
 - Needs re-training & cortical mapping
- PFMs fatigue quickly in upright postures = intra-abdominal pressure
 - Less fatigue in supine

9. Milios, 2018 ANZCJ Summer Edition



550

Being DRY = No Pads = 0g leakage

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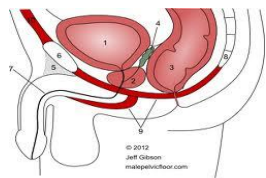
Allow 4g/24 hours for perspiration



551

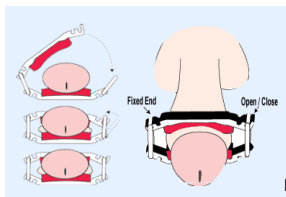
Treatments for PPI

Pelvic Floor Muscle and Bladder Training

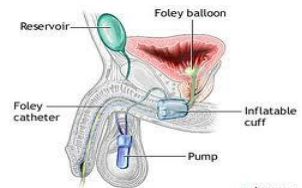


Pads & Penile Clamps

Anderson C 2015
Cocoran Review



Surgery-Sling or Artificial Urinary Sphincter (AUS)



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ADAM

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MEN'S HEALTH PHYSIOTHERAPY

PELVIC FLOOR TRAINING in AMAB



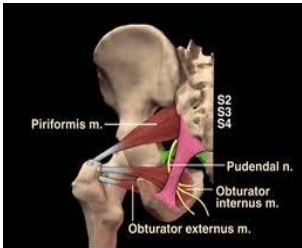
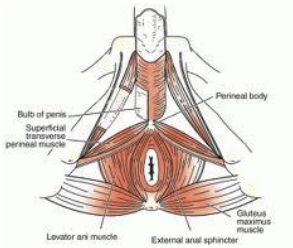
553

LINK??



'Distribution of the pelvic floor in human motor cortex is poorly represented ' & recent MRI studies are addressing this.....

10. Yani M, Kutch J 2018



• Dr JEMilios 2024

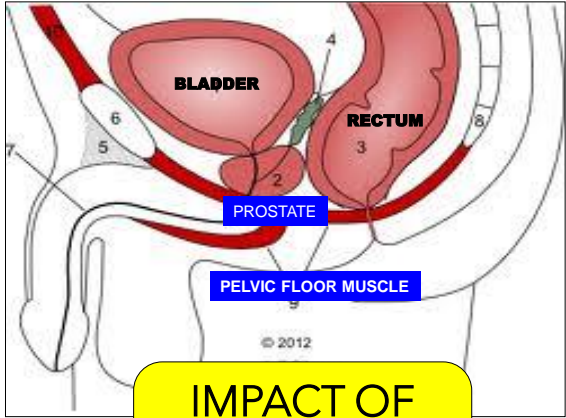


554

Physiology of PFM

30%
Fast
Twitch

Rapid
Cough,
Sneeze,
Sit-Stand
Orgasm
Climacturia



70%
Slow
Twitch

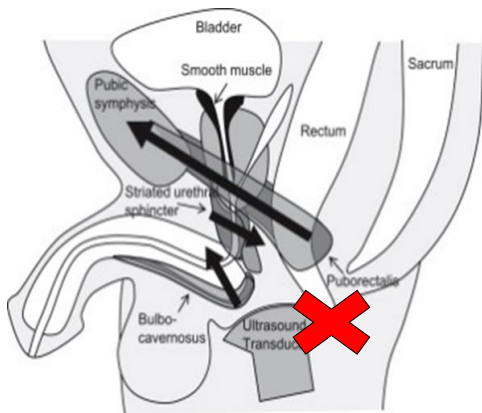
Endurance
Bladder, Bowel
& Sexual
Function/ED,
Activity over
time: standing,
walking

**IMPACT OF
PFM
FATIGUE???**

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PFM Action in Men



- Anterior focus (urinary) vs posterior focus (rectal)
- TransPerineal real time ultrasound verifies correct technique
- Puborectalis/EAS - dominates, stronger, innate awareness
 - All three create a horseshoe activation to compress and kink the EUS for continence
- Incorrect focus traditionally, Puborectalis/EAS

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Correct PFM Technique In Men

3 Components When Cueing Technique

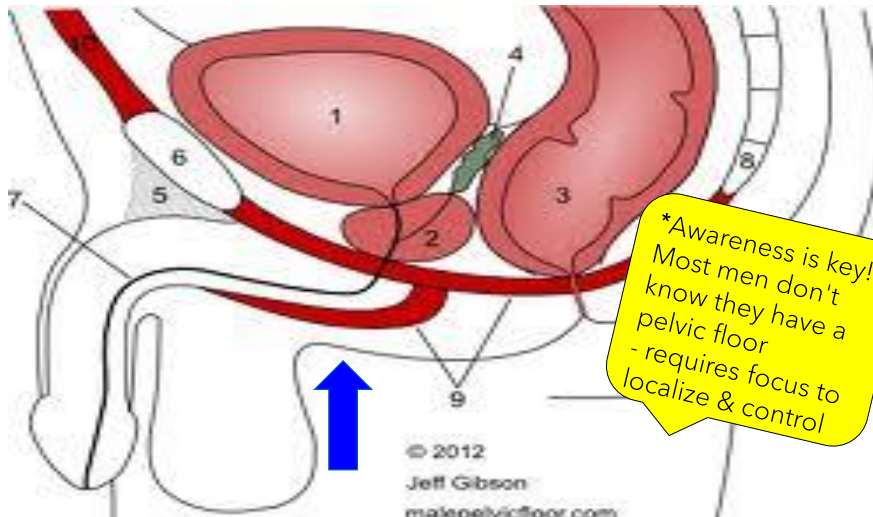
- * Relax belly & buttocks, keep breathing and/or count out loud to avoid abdominal, gluteal and adductor activation, gentle action only
- 1. Tighten muscles around the urethra to stop the flow of urine (ie **"squeeze"**) = External Urethral Sphincter (EUS)/SUS
- 2. Draw the testes up inside the pelvis; to **'lift'** and retract or **"shorten"** the penis = activates Bulbocavernosus (BC) to compress the bulb of urethra
- 3. Gently **'tighten'** the muscles around the anus = Puborectalis (PR), pulls urethra anteriorly and elevates the bladder neck

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11.Stafford R & Hodges 2016 "Verbal Cues in male PFM training "



557



"Squeeze front passage
& lift nuts to guts"

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558

558



Skeletal Muscle Physiology

12. Kraemer WJ. 2004

BASIC PRINCIPALS OF SKELETAL MUSCLE TRAINING

For training, strength & conditioning human skeletal muscle requires:

- Maximal Voluntary Contraction - activating all available motor units
- PFM motor programming requires fast & slow twitch fibre activation
- Specificity, hypertrophy, strength & endurance training
- 8 weeks minimum training period plus load for maximal strength
- Dose endurance training requires high number of repetitions e.g. HIIT

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MEN'S HEALTH PHYSIOTHERAPY

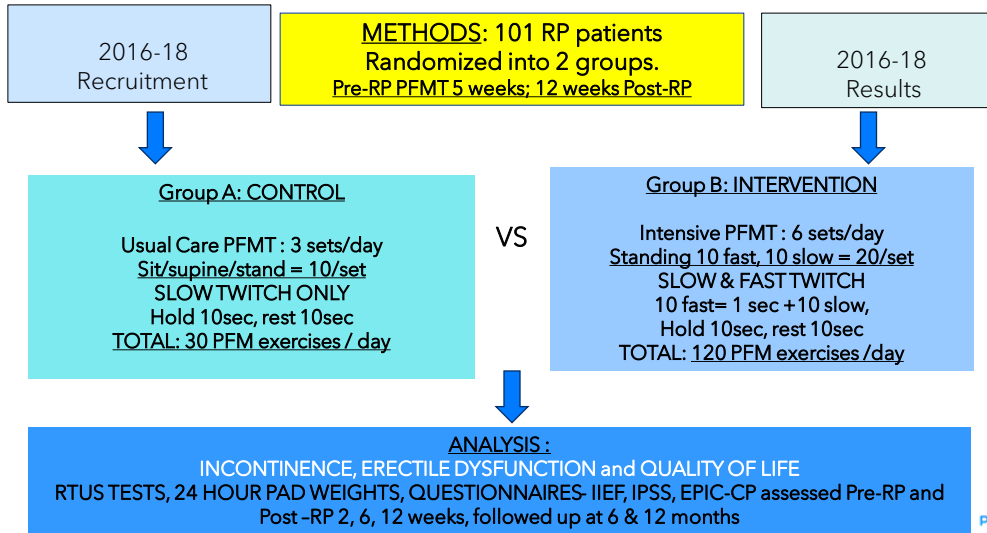
PELVIC FLOOR TRAINING ORIGINAL RESEARCH



560

Jo Milios PhD: RCT in 101 RP subjects 'Usual Care' vs 'High Intensity' PFMT

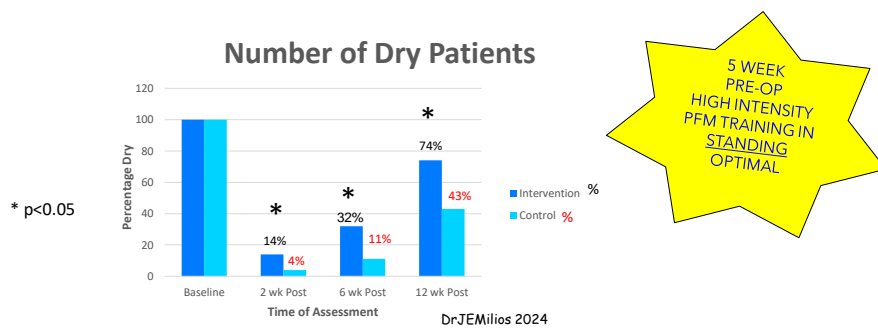
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561

1. Results: Continence

13. Milios JE BMC Urology 2019(19) 116



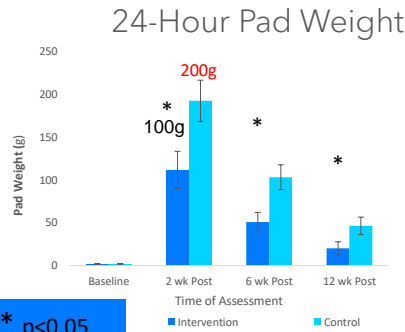
- 3.5 X More men DRY at 2 weeks post-RP in INTERVENTION group, i.e. 1 in 6 men DRY vs 1 in 25 in the CONTROL group from outset
- 74% INTERVENTION group DRY at 12 weeks post, 43% of control
- Pre-RP 5 weeks HIGH INTENSITY PFM is OPTIMAL for minimising PPI

562



2. Results: 24-Hour Pad Weight

13.Milios JE BMC Urology 2019: 19 (116)



50% less leakage from outset post-RP with 5 week pre-op PFMT

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* p<0.05

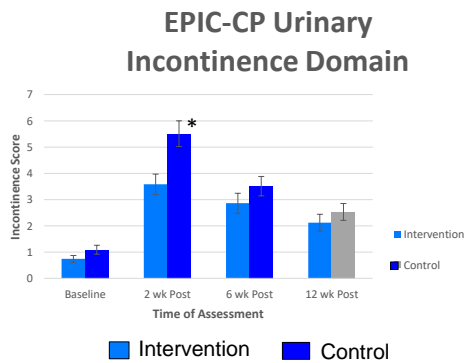
- 50% LESS LEAKAGE from 2 weeks post-op in INTERVENTION vs CONTROL group
- = FASTER CONTINENCE RECOVERY in INTERVENTION vs CONTROL over 12 weeks



563

3. Results: Quality of Life EPIC-CP Urinary Continence Score

13.Milios JE BMC Urology 2019 : (19) 116



* p<0.05

Significantly HIGHER distress post-RP in control at 2/52. Lower scores better

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- Pre-op: All continent. Similar levels of urinary function pre-op.
- Post-op: SIGNIFICANTLY more distress in CONTROL vs INTERVENTION at 2 weeks



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SUMMARY OF RESULTS: RCT: PRE & POST PFMT STUDY 'USUAL CARE' vs 'HIGH INTENSITY'

97 PARTICIPANTS
ALL 5 WEEKS Pre- RP PFM TRAINING
12 weeks post-RP PFM TRAINING



CONTROL:
3 sets/ PFM day
1 each in
supine, sit, stand
Each set =
10s lift, 10s rest
SLOWTWITCH
n=30 PFM/day
47 men

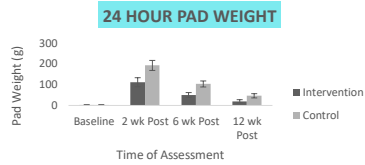
INTERVENTION: 6
sets PFM/ day
ALL STANDING
Each set =
10 FAST(1sec)
10 SLOW(10sec)
FAST & SLOW
TWITCH
n=120
PFMs/day 5
0 men



ASSESSED PRE-OP & POST-OP
2 WEEKS, 6 WEEKS, 12 WEEKS
24 hour pad weight, PFM function tests
IPPS and EPIC-CP questionnaires



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RESULTS:

- CONTROL had **DOUBLE** the leakage vs INTERVENTION group & delayed continence
- 1 in 6 DRY from outset (16%)
- QOL scores from outset **HIGHER** in INTERVENTION both UI & ED vs CONTROL



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MEN'S HEALTH PHYSIOTHERAPY

PREHABILITATION & REHABILITATION & SCHEDULING



566

Assessment Forms

- **Bladder charts** : 1, 3 or 7 day tests of 24 hour pad weight
- Bowel diaries : 1- 3 days , Bristol Stool Scale
- **ICIQ**: International Consultation of Incontinence
- **IIEF**: International Index of Erectile Function
- **IPSS**: International Prostate Symptom Score
- **EHS**: Erectile Hardness Score
- **EPIC-CP**: Extended Prostate Cancer Impact- Clinical Practice
- **PROSTATE CANCER QoL DISTRESS THERMOMETRE**:
<http://www.prostate.org.au/media/458256/ProstateCancerDistressForm.pdf>
- **DAS 21**- Depression, Anxiety and Stress Scale

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Prehabilitation Physiotherapy Schedule

- Pre-op Visit 1: see patient ASAP from date of diagnosis, utilizing biopsy to surgical date - usually 5-6 weeks - urology referral
- Commence high intensity PFM training in standing - 6 sets/day
- Educate on bladder training, diuretics, alcohol reduction
- Assess and teach correct PFMT technique - RTUS if possible
- Encourage daily walk 30-60 mins/ 5km per day if possible
- Pre-op Visit 2 : see patient 1 week prior to surgery
- Review PFM technique, enhance duration
- Outline post-op restrictions - lifting >5kg for 6 weeks
- Provide information about pads, penile clamps & corrective surgeries
- Discuss penile rehabilitation and erectile dysfunction
- Outline post-op physiotherapy schedule



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Rehabilitation Physiotherapy Schedule

- Post-op Visit 1: see patient 1 week after catheter removal
 - Assume everyone is different - DRY to uncontrolled leakage
 - Expect worsening PPI as the day progresses due to PFM fatigue
 - Re-assess PFM technique
 - Encourage midday rest period 1-2 hours to re-charge PFM
 - Encourage daily walk 30 mins
-
- Post-op Visit 2 : see patient 4 weeks post- surgery
 - Increase PFM exercise regime to include functional training
 - Wean off night pads , then progress to smaller pads in day
 - Encourage penile pump regime
 - Post -op see 2-4 weekly until pad free, PSA free & on penile rehab



569

24 Hour Bladder Diary			Date 12/03/14		
Time	Drinks		Urine		Pads
	Amount (ml)	Type	Amount (ml)	Bladder Sensation	
6am			500	2	
7 am	300	Water			
8 am			✓	2	
9 am					
10 am	Cup	Tea	LEAK	3	✓
11 am					
Midday					



1g = 1 ml urine
Total pad weight- dry
pad weigh

Assessing PPI

- Assess using 24 hour bladder diaries - 1-3 day options
 - Volume intake, types of fluids, hydration
 - Volume output - measuring jug (ml) or time (seconds)
 - Activity - e.g. gym, golf or sedentary day
 - Pad weight: 1ml = 1g of urine loss
- Number of pads irrelevant
- * Time since surgery?
Impact of PFM fatigue ?????
Time of day? E.g. late afternoon
- * Chart anxiety may be an issue

- 14. Malick 2016



570

RRT: Rapid Response Test (sec) 9.Milios JE ANZCJ 2018

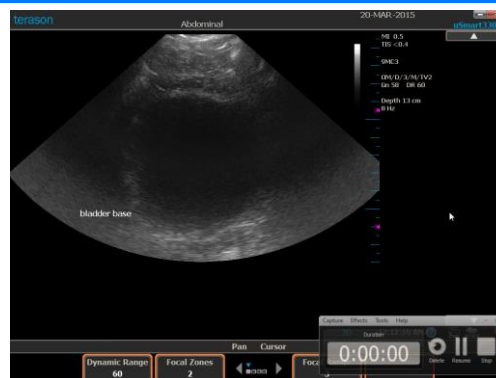


"Do 10 PFM maximal contractions as fast as possible"

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SET: Sustained Endurance Test (sec) 9.Milios JE ANZCJ 2018



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"Perform 1 maximal PFM contraction, keep breathing normally and hold for as long as possible" (0-60sec)"

572

Baseline PFM Function Tests

RRT - Rapid Response Test

- Targets fast twitch fibres for reflex control
- SUI /under exertion
- Aim to do 10 contractions in >8 sec
- Fast, strong, maximal
- Equal lift to rest time
- Baseline training goal

SET - Sustained Endurance Test

- Targets slow twitch fibres for endurance
- Assists PFM fatigue
- Aim to do 60sec in standing or point of fatigue
- Maximal contraction
- Baseline training goal



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Milios Pad Weaning Protocol

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1. Diapers/ Pull ups usually unnecessary if PFM prepared pre-op as men often feel ashamed/ demasculinised wearing "nappies" - not required
2. Day: Encourage Pads - TENA Men Level 2 (medium) ASAP
 - Night: Tena or Depend Shield
 - **WHEN DRY FOR 3 NIGHTS IN A ROW, DISCARD PADS!**
3. Delay pad application in mornings
4. Apply pad if going out, exercising, work or social activities ONLY
5. No pad in mornings and evenings
6. Apply Shield if out or alcohol consumption
7. Place Shield in pocket for back-up
8. **FORGET to wear a pad? = CURE!!!**

***Psychological benefits**

- Reduces pad dependence
- Improves awareness
- Increases confidence
- Enhances masculinity



574

Bladder Training

- Review 24-hour fluid intake - type, volume and void frequency, using a bladder chart. 3-day chart recommended

Purpose:

- Increase bladder capacity pre-op to 1 nocturia, 4-6 voids/day; *Note: men may have nocturia++ due to BPH (prostate), Obstructive Sleep Apnoea (OSA), Diabetes or Cardio-vascular issues. Flag if unknown cause.
- Increase awareness of bladder 'urge' vs 'habitual' voids
 - i.e.: physical 'need' or 'mental' decision
- Minimise 'just in case' toilet visits
- 'Condition' PFM to increased work load & endurance tasks
- Educate re: impact of bowel function on bladder function, and need for minimising straining & constipation DrJEMilios 2024

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MILIOS PENILE CLAMP PROTOCOL



1. Fit penile clamp- Weisner or Dribblestop
2. Wear during the waking hours ONLY
3. Wear for a minimum of 2 hours, max 4 hours
4. Wear 6 days/week
5. Bladder chart 1/week 'day off'
6. Wear 4-6/52, wean off pads, temporary use only
7. May use in combination with Anti-cholinergic e.g. Betmiga to enhance bladder calming



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MEN'S HEALTH PHYSIOTHERAPY

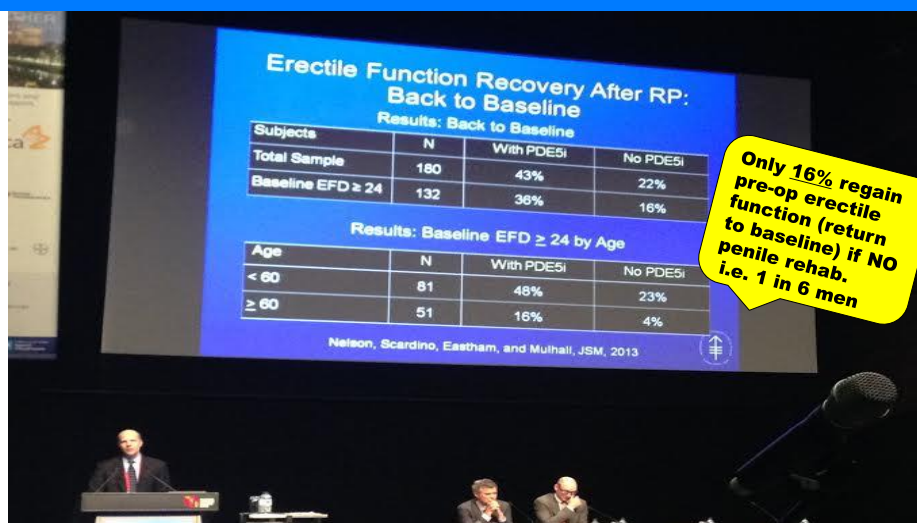
Post-Prostatectomy Erectile Dysfunction (PPED)



577

Incidence of PPED

Prof Chris Nelson #APCC14



Jomielios 2016©
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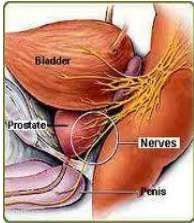
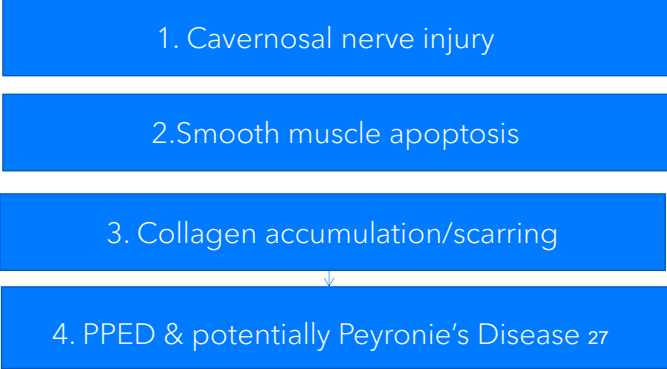
6. Nelson, 2013 J Sex Med



578

PPED & Neuropraxia

- Damage to cavernosal nerves, vascular supply & smooth muscle equates to minimum loss of 1500 'housekeeping erections/year' 20, regardless of sexual activity i.e. 4-6 nocturnal erections/night

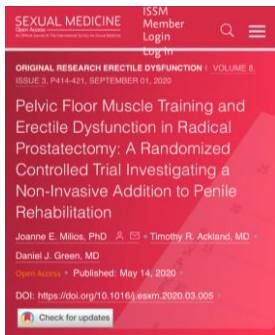


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15.Lumbroso: www.lifeafterprostatecancer.com; 16.Kirby 2013; 17 Tal 2013

579

Dr Jo Milios Publication # 4 PFM for ED in Prostate Cancer Original Research Published 2020 18. Milios JE J of Sex Medicine 2020



JEMilios 2019

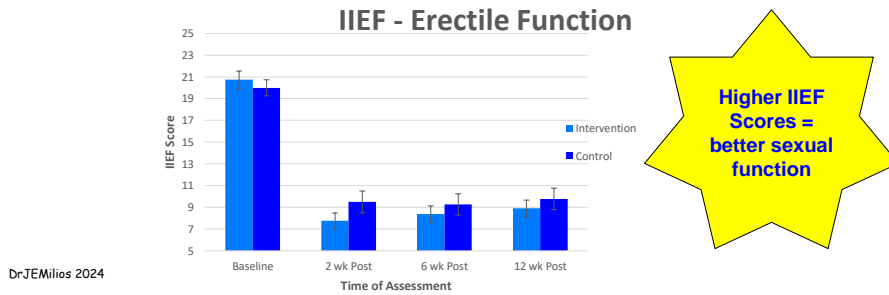
Education from
Physiotherapists



580

RESULTS: Pre & Post-RP Erectile Function (IIEF)

18.Milios JE. Sex Med Vol 8 (3), 325-576 2020



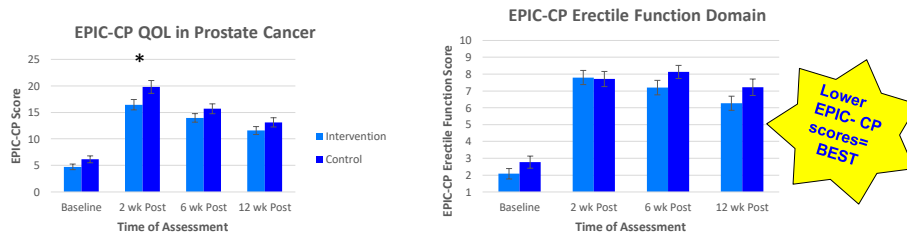
- Pre-op (baseline) both groups similar
- Immediate post-op IIEF erectile function drops to similar level for each group
- No statistical difference in erectile function initial 12 weeks, linked to neuropraxic effect and similar to findings by others. Typically a 3-4 month effect post-RP.

581

RESULTS: Quality of Life EPIC-CP Erectile Function Score

18.Milios JE. Sex Med Vol 8 (3) 325-576 (September 2020)

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- At 2 weeks post-RP, clinically & statistically significant **QUALITY OF LIFE** scores is **HIGHER** in **INTERVENTION** vs **CONTROL** with **LESS DISTRESS**
- At 12 weeks **INTERVENTION** group were **more sexually active** than control group (1:6 ratio) due to **less PPI** and earlier commencement of **penile rehabilitation**

582

Penile Rehabilitation

The use of any drug or device at the time or following radical prostatectomy to facilitate restoration of erectile function (EF)



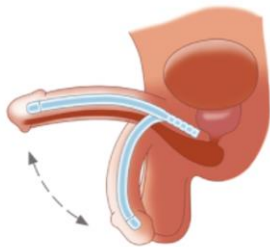
Education from Allied Health team
 16.Kirby, VCD protocols in Erectile Dysfunction 2013
 DrJEMilios 2024



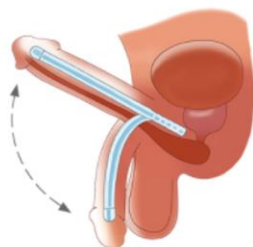
583

Surgical Implants for ED When PP-ED persists for more than 2 years

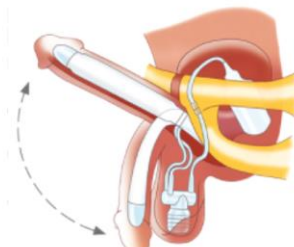
SOFT PENILE IMPLANT



MALLEABLE PENILE IMPLANT



INFLATABLE PENILE IMPLANT



584

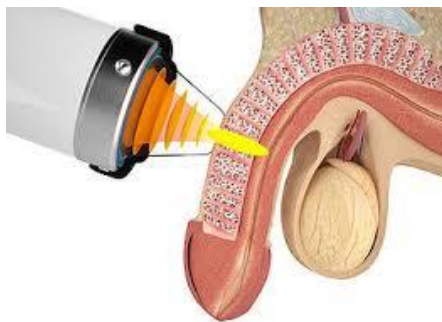
MEN'S HEALTH PHYSIOTHERAPY

Shockwave Therapy in Prostate Cancer Rehabilitation



585

Low Intensity Focal Extracorporeal Shockwave Therapy – a new treatment option

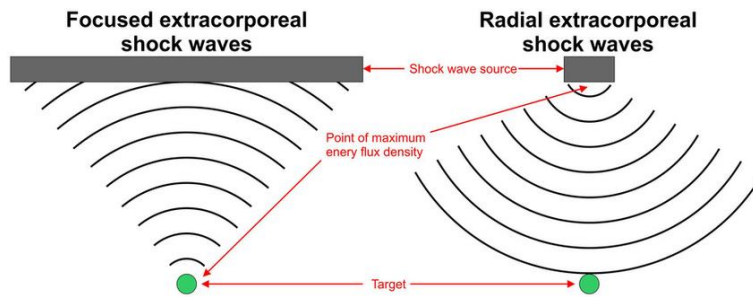


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FOCUS vs RADIAL SHOCKWAVE THERAPY



Effect on target differs significantly

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FOCUS vs RADIAL SHOCKWAVE THERAPY

FOCUSED		RADIAL
100 - 1000 bar	pressure	1 - 10 bar
≈ 0,2 μs	pulse duration	0,2 - 0,5 ms
focused	pressure field	radial, divergent
large	penetration depth	small, superficial
cells	effect	tissue

Depth = up to 12cm, angiogenesis

588

Summary Radial vs Focused Shockwave

- Focal Shockwave - longer history , more evidence
- Systemic reviews - established in Focal ESWT, less in radial ESWT
- Radial shockwave (soft shock) , treats large superficial areas
- Focussed ESWT is more precise, has greater depth and more comfort
- Radial pressure wave - maximum at skin, attenuates up to 7.5cm
- Radial - superficial structures 3-4cm depth, spreads wide & weakens
- Focus ESWT (hard shock)- 5-6cms depth focal point , up to 12cm
- Focus EWST is faster and treats at a precise location
- More tolerable in acute injuries vs radial ESWT

589

PENILE application of Li-FSWT

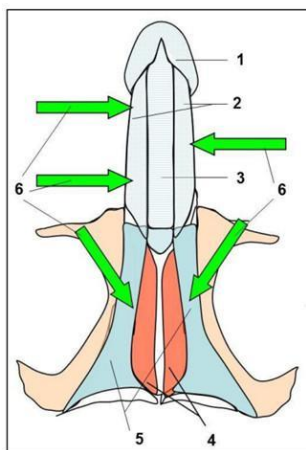


Figure 1: Schematic picture showing treatment areas



- 1 Glans penis
- 2 Corpus cavernosum
- 3 Corpus spongiosum
- 4 Bulbospongiosus muscle
- 5 Ischiocavernosus muscle
- 6 Treatment directions

590

Early Post- RP ED & ESWT Evidence

- Review paper: Published: 27 November 2017

1. Low-intensity extracorporeal shock wave therapy for erectile dysfunction after radical prostatectomy: a review of preclinical studies

19. Zi-jun Zou, Jia-yu Liang, Zhi-hong Liu, Rui Gao & Yi-ping Lu *International Journal of Impotence Research* volume 30, pages1–7(2018)

2. Low-intensity extracorporeal shockwave therapy in the treatment of postprostatectomy erectile dysfunction: a pilot study - RCT (16 participants)

20. Anders Frey, Jens Sønksen & Mikkel Fode 2016

591

Jo's Post- RP ED ESWT Feedback

- Early Li-ESWT 2-3 months post-RP no improvement noted, n=20. Ensure PSA clearance before commencing.
- Minimum 6 months post RP - some results seen n= 30
- Spontaneous morning erections, penile engorgement seen 1st
- 1-2years+ post RP - significant improvement noted n= 30
- Many patients shift from ICI's injections to PDE5's n= 20
- Some patients can wean off all medications n= 5
- Penile shaft + crus + perineum/ischiocavernosus need ESWT



592

Post- RP ED ESWT Patient Selection

- Patients with ED are VULNERABLE and seek cure which may not be obtainable, so REALISTIC expectations are needed
- Pre-RP erectile function baseline needs to be known (IIEF)
- Status of cavernosal nerve sparing needs to be known = Unilateral? Bilateral? Non-Nerve Sparing?
- Age of patient - younger = improved vascular status
- Time since surgery & response to penile rehabilitation?
- **Oncological outcomes? Cancer clearance? PSA status?**

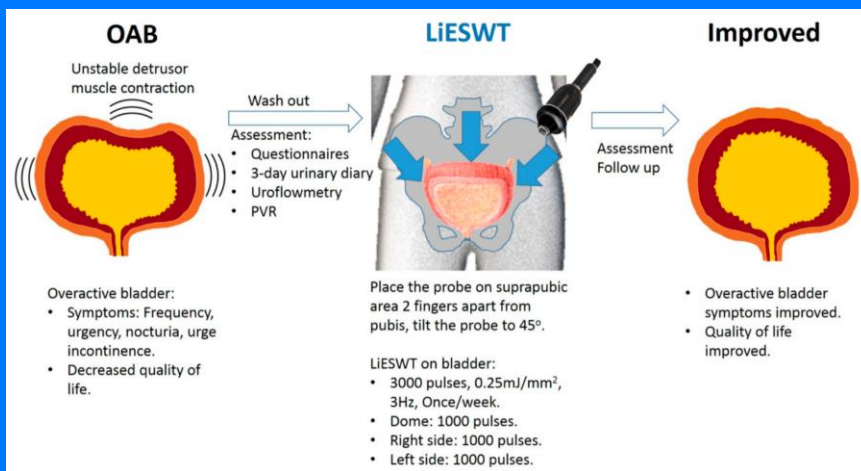


PELVICON

593

PPI and OAB

21. Lu J, Shen L 2021



PELVICON

594

PROST! Exercise 4 Prostate Cancer

Building....
MOOD
MUSCLE
MATESHIP

www.prost.com

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Takeaways

- Prostate Cancer is the leading men's health issue in men's health physiotherapy and requires knowledge in both continence and sexual health
- Prehabilitation is essential to ensure patients are well prepared prior to treatment and to maximize outcomes
- Rehabilitation is multifactorial - pelvic floor & bladder training, penile rehabilitation, functional exercise & potentially, focal shockwave therapy
- It is never too late to help - think of GINO!



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THANK YOU!!



My prostate cancer patients who
taught me everything!
Contact: jomilios22@gmail.com
Twitter: @prostatejojo
FB: Men's Health Physiotherapy Group
Instagram: DrJoMiliosPhysio

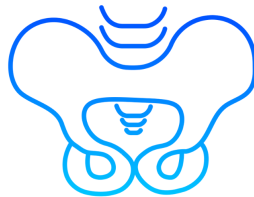
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Q&A

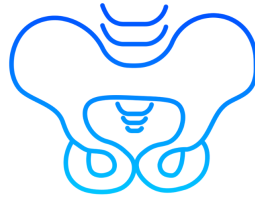


PELVICON



598

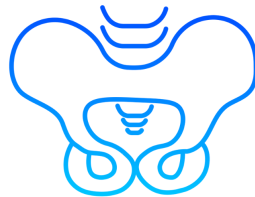
Ask Me Anything!



P E L V I C O N

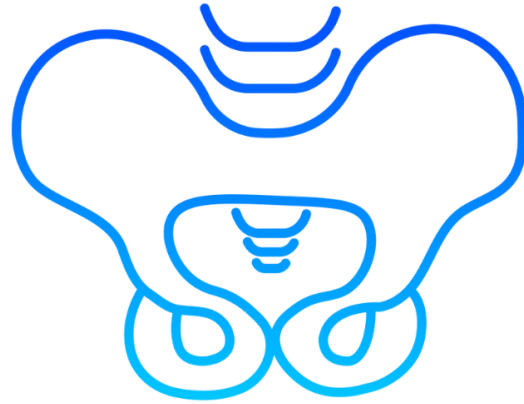
599

Lunch & Vendor Hall



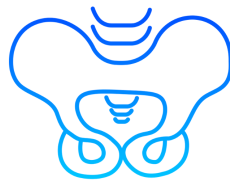
P E L V I C O N

600



P E L V I C O N

601

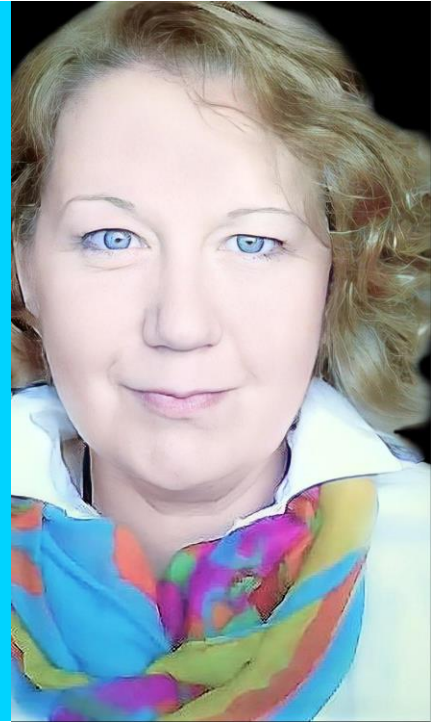


P E L V I C O N

602

IBD & IBS – Getting Good Outcomes in Gastroenterology

Michelle Lyons



603



Michelle Lyons



About Me

- Graduate of UCD's School of Physiotherapy
- Postgraduate in Botanical & Herbal Medicine (University of Arizona)
- Postgraduate in Health Coaching & Nutrition (University of Galway)
- Teacher training qualifications in yoga, pilates & mindfulness
- Instagram: michellelyons_muliebrity

604

Financial Disclosures

- Owner/Operator at CelebrateMuliebrity.com:
- Online/ Live Continuing Education in Women's Health
- Other affiliations include:
- FIFA
- Sport Ireland
- Pelvic Health Solutions



605

Bowel Health – why does it matter?

- What we'll discuss today...
- Why female bowel health is different...(why we need gastro-gynae!)
- Building a Better Bowel Business!
- Evidence based strategies for pelvic rehab



606

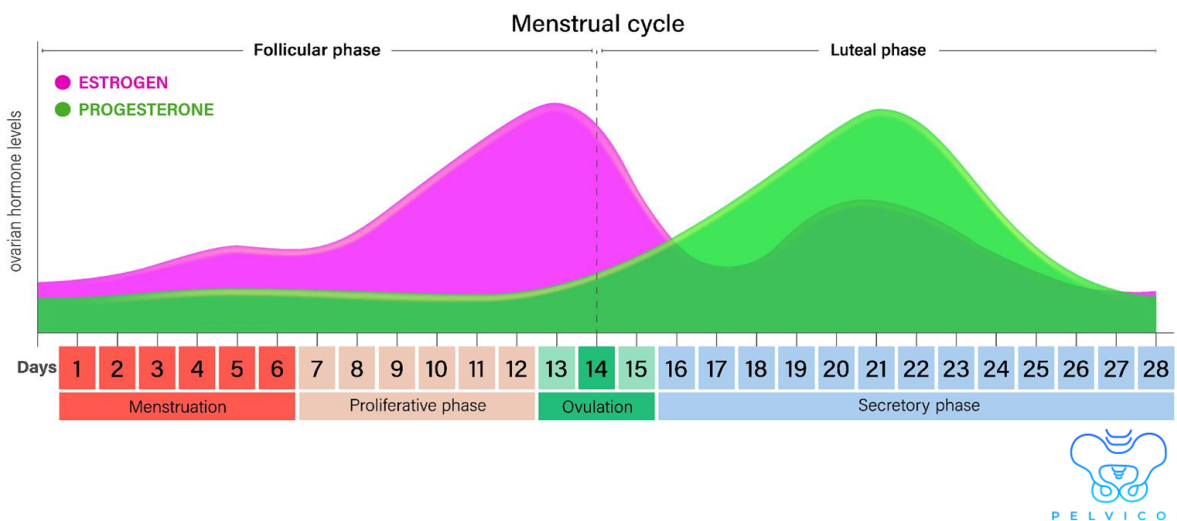
Gastro-Gynae?

- ‘...women are more prone to gastrointestinal issues than men...’ Coquoz et al 2022
- Menstrual
- Maternal
- Menopausal



607

Menstrual, Maternal & Menopausal



608

IBD

- What distinguishes IBD from inflammatory responses seen in the normal gut is an **inability to downregulate inflammatory responses** ...the mucosal immune system remains chronically activated, and the intestine remains chronically inflamed



Immunoregulatory Pathways Involved in Inflammatory Bowel Disease

Gabriela Fonseca-Camarillo ¹, Jesús K Yamamoto-Furusho

Affiliations + expand

PMID: 26111210 DOI: 10.1097/MIB.0000000000000477

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Inflammatory Bowel Disease

Ulcerative Colitis

- Affects female/male
- Colon/ rectum
- Diarrhoea is the main symptom, often accompanied by rectal bleeding

Crohn's Disease

- More common in Females
- Anywhere in the GI tract – mouth to anus, but usually small and large intestine – can also affect adjacent structures)
- Main symptoms are diarrhoea, abdominal pain, anaemia & weight loss



610

Fibre

- For a minority of IBD patients if narrowing/strictures that haven't been addressed medically/surgically
- But not for majority of pts...
- Old thinking – bowel urgency is the problem, so let's make you constipated...
- Removing the very thing that will ameliorate the disease process!!!



Yannai et al 2022

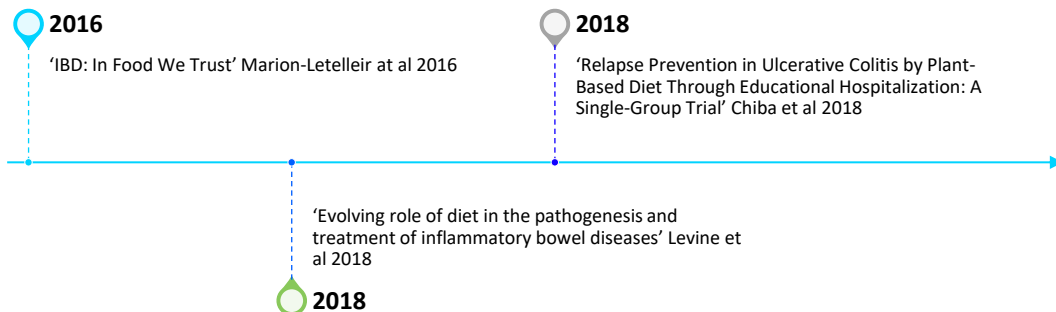
'The Crohn's disease exclusion diet for induction and maintenance of remission in adults with mild-to-moderate Crohn's disease'

Among the 21 patients treated with whole-food dietary treatment alone, 12 achieved clinical remission by week 6, and 8 remained in remission at 6 months. This was a small but carefully designed prospective study.

Complete remission in 57% at week six and sustained remission in 67% of responders. Without medications.

611

'But diet has nothing to do with IBD...'



612

Does Food Matter?

- Carnivore/paleo diet – predominantly meat and dairy
- Decreased microbial diversity after 4 days and an increase in bacterial subtypes that triggered inflammatory bowel reactions (bilophila wadsworthia – directly associated with triggering IBD)
- Reducing dairy with IBD is not controversial
- 1964: Sydney Truelove – increased dairy = increased IBD symptoms, decreased dairy = decreased IBD symptoms



613

The Role Of Exercise in IBD?

> Dig Dis Sci. 2021 Feb;66(2):597-604. doi: 10.1007/s10620-020-06222-5. Epub 2020 Apr 1.

Improvement of Fatigue and Quality of Life in Patients with Quiescent Inflammatory Bowel Disease Following a Personalized Exercise Program

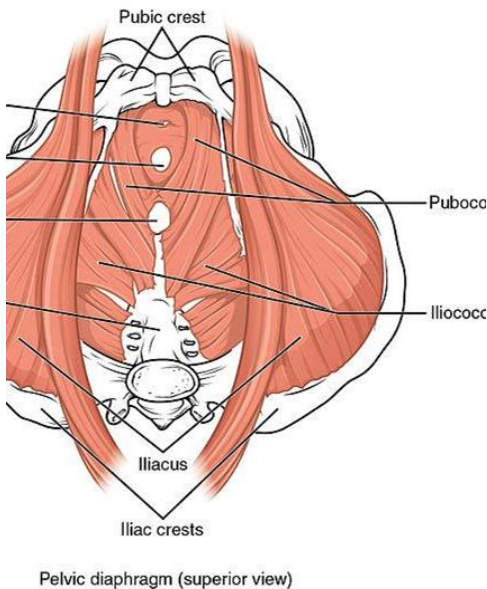
Liselot W van Erp ¹, Britt Roosenboom ², Prashant Komdeur ³, Wendy Dijkstra-Heida ², Jolien Wisse ², Carmen S Horjus Talabur Horje ², Camilo S Liem ⁴, Robert E H van Cingel ^{3 5}, Peter J Wahab ², Marcel J M Groenen ²

Affiliations + expand

PMID: 32239380 DOI: 10.1007/s10620-020-06222-5



614



Van Erp et al 2021

- Fatigue significantly impacts the quality of life of patients with inflammatory bowel disease
- 12 week program, aerobic & resistance
- A personalized, intensive exercise program can lead to significant improvement of fatigue, HRQoL, and cardiorespiratory fitness in patients with quiescent IBD and severe fatigue.



615

Bondurrie et al (2015)

'Pelvic Floor Dysfunction in IBD'

- '...Patients present with a wide spectrum of conditions - **anal incontinence, obstructed defecation and pelvic pain** among the most frequent - *that have a great impact on their quality of life.*'
- '...**pelvic floor muscle training and biofeedback**: these treatments have been proven effective in IBD patients.
- Some new minimally invasive alternative strategies are available for IBD patients, as sacral nerve and **posterior tibial nerve stimulation.**'



616

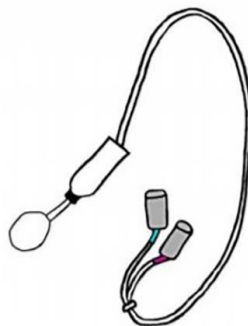
Bondurri et al 2015

- ‘... **A particular issue among defecatory symptoms in patients with IBD is paradoxical puborectalis contraction**...if this disorder is properly diagnosed, a conservative treatment is indicated, thus avoiding unnecessary laparotomy for small bowel occlusion.
- ‘Pelvic pain management, coordinated by a specialist with expertise in pelvic floor disorders, includes many options, which vary from oral or local therapies to **pelvic floor rehabilitation** and **sacral nerve stimulation**.’
- ‘...Diagnosis and investigation of **anorectal functional disorders** in patients with IBD is important in order to implement better-suited diagnostic and therapeutic strategies, so as to avoid unnecessary and potentially detrimental medical and surgical therapies, **with the final aim of improving patients' quality of life.**’

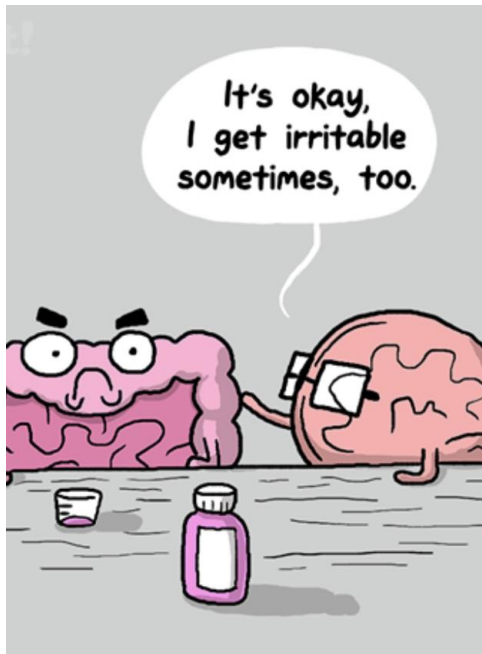


617

Pelvic Rehab Toolbox:



618

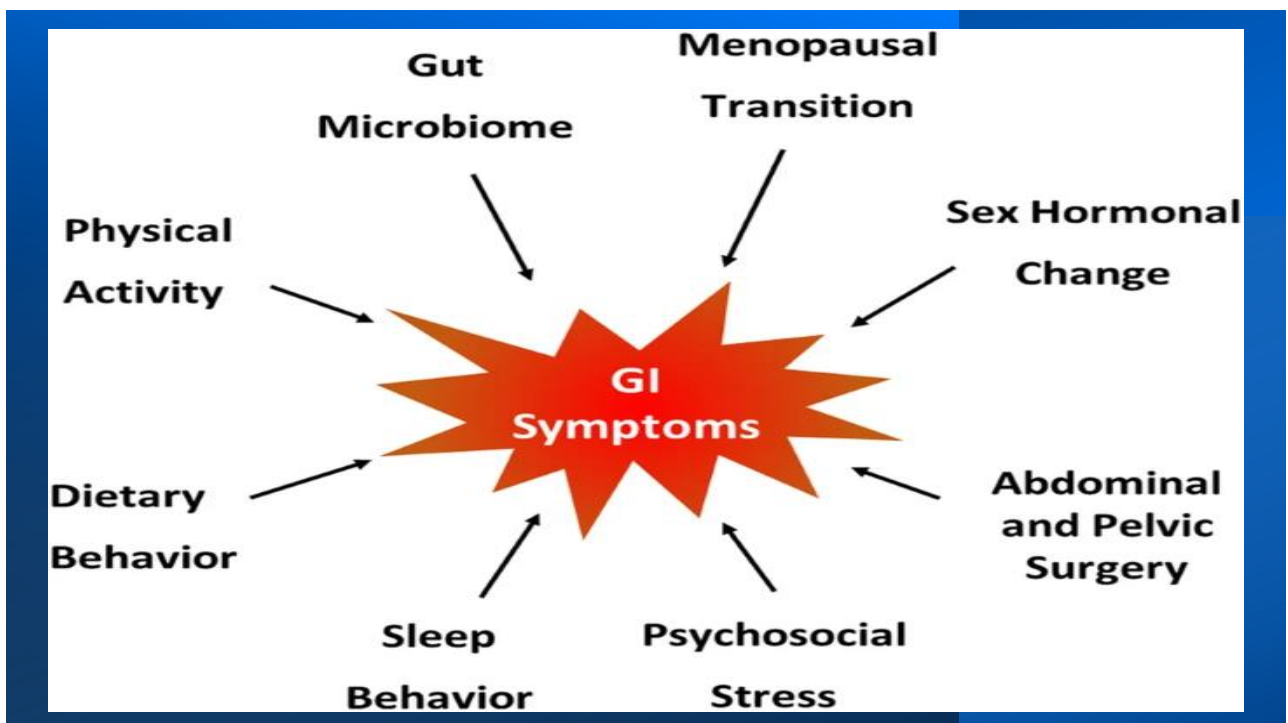


IBS: what is it?

- Irritable bowel syndrome is a gastrointestinal sensory and motility disorder characterized by abdominal pain or discomfort associated with a change in bowel habits.
- A functional disorder of the Gut-Brain Axis
- 1 in 10 globally; For every 3 people with IBS, 2 of them will be female



619



620

IBS ...or is it?

- Endometriosis
- Abdomino-phrenic Dyssynergia
- PFD
- Ovarian Cancer (BEAT)

PubMed®
Advanced User Guide



Does irritable bowel syndrome increase the risk of interstitial cystitis/bladder pain syndrome? A cohort study of long term follow-up

Kun-Min Chang et al. Int Urogynecol J. 2021 May.

The Rome diagnostic criteria define the abdominal pain or discomfort of IBS as originating 6 months before diagnosis, being currently active for 3 months, and being associated with at least 2 of 3 features:

- (1) relieved with defecation
- (2) onset associated with change in stool frequency; and
- (3) onset associated with change in stool form.

IBS is subclassified based on stool consistency as IBS with constipation, IBS with diarrhoea, or IBS with mixed or alternating constipation and diarrhoea



621

Nickel et al 2010

- 'Interstitial Cystitis/Painful Bladder Syndrome and Associated Medical Conditions With an Emphasis on Irritable Bowel Syndrome, Fibromyalgia and Chronic Fatigue Syndrome'
- IBS, fibromyalgia and CFS are more prevalent in patients with IC/PBS than in asymptomatic control subjects, and result in significant impact

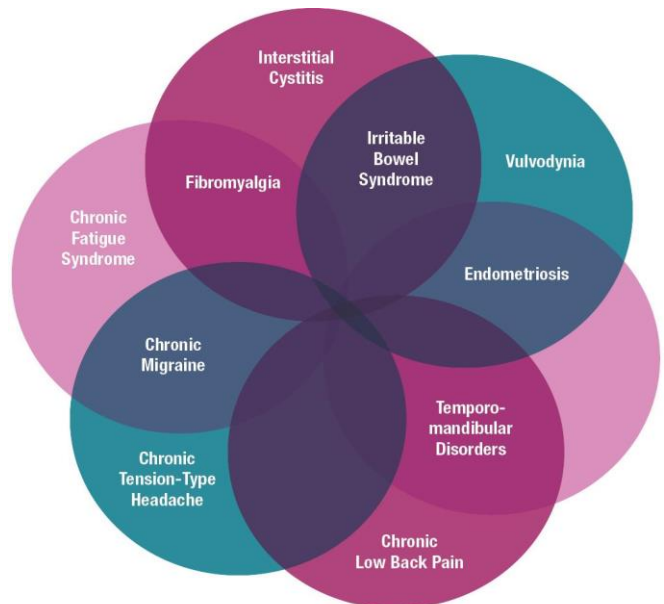


Figure 1. A sample of chronic overlapping pain conditions (Courtesy CRPA).

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Rx?

- **Diarrhea Dominant**
- (Stool formation, EAS Coordination, TTNS)
- **Constipation Dominant:**
- EAS Coordination, Mobility, Movement, TTNS
- **Both:** Lifestyle, Stress & Time management



IBS...

CONSTIPATION

DIARRHOEA

STOP

OR

EVERYTHING MUST GO

Michelle Lyons
celebrate mullebrity

623

'Endo Belly'

- It can be IBS or Endo
- Or Endo AND IBS!
- Cyclical patterns?
Dyschezia?
- Schumann 2017; Moore et al 2018: low FODMAPS vs Yoga?



People with endometriosis have
threefold risk of developing IBS
(Naby et al 2022)



624

Abdominal Bloating

- More severe in women and associated with constipation dominant/ mixed IBS
- 58% never sought care: hesitant to discuss with their medical providers
- What about women with back pain? Are we asking about GI issue and PFD?



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Clinical Gastroenterology and Hepatology **aga**

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ORIGINAL ARTICLE | FUNCTIONAL DISORDERS | VOLUME 21, ISSUE 9, P2370-2377, AUGUST 2023 [Download Full Issue](#)

Abdominal Bloating in the United States: Results of a Survey of 88,795 Americans Examining Prevalence and Healthcare Seeking

Janice E. Oh • William D. Chey • Brennan Spiegel [A](#) [E](#)

Published: November 14, 2022 • DOI: <https://doi.org/10.1016/j.cgh.2022.10.031> • [Check for updates](#)

Abdominal Bloating

- 66-90% of people with IBS have bloating/distention
- ROME IV – included bloating as an important feature of IBS
- Diet
- SIBO
- Constipation
- Visceral Hypersensitivity
- Abdomino-phrenic Dyssynergia
- PELVIC FLOOR DYSFUNCTION



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[Journal List](#) > [Gastroenterol Hepatol \(N.Y.\)](#) > [v.18\(2\);2022 Feb](#) > [PMC9053509](#)



[Gastroenterol Hepatol \(N.Y.\)](#), 2022 Feb; 18(2): 75-84.

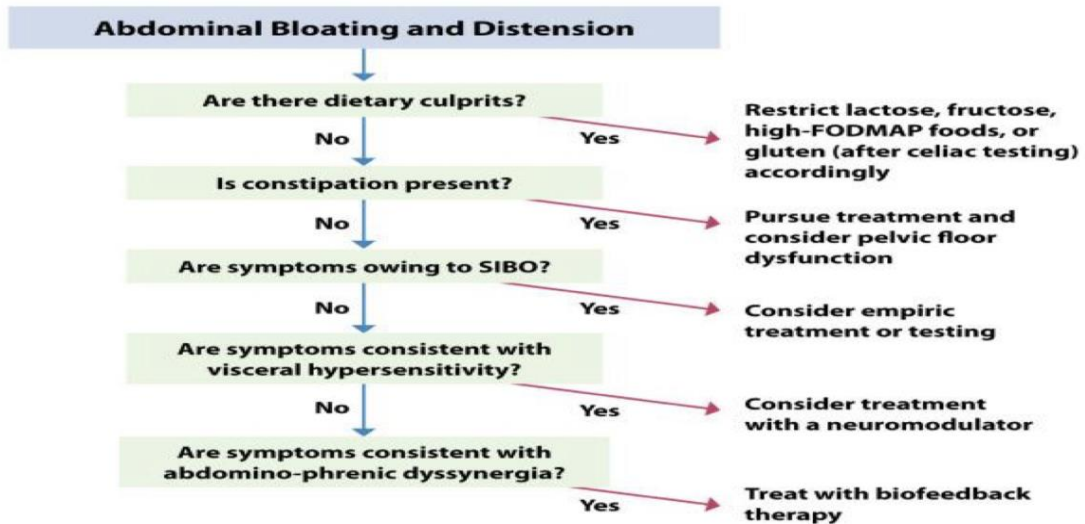
PMCID: [PMC9053509](#)

PMID: [35505814](#)

A Practical Approach to the Diagnosis and Treatment of Abdominal Bloating and Distension

[David J. Cangemi, MD[®]](#) and [Brian E. Lacy, PhD, MD](#)

Practical Approach to the Diagnosis and Treatment of Abdominal Bloating & Distension' Cangemi & Lacy (2022)



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Pei-Lin Yang et al (2021) 'Irritable bowel syndrome in midlife women: a narrative review'

- For many women with and without IBS, **gastrointestinal symptom severity fluctuates with the menstrual cycle and continues through the menopause transition and into the postmenopausal period** (Callan 2019).
- Midlife women between the ages of 40 and 65 years have reported multiple challenges due to menopausal, developmental, and situational transitions from younger to older adulthood.
- Multiple factors including **stress, poor sleep, diet, and physical inactivity may contribute to IBS or gastrointestinal symptoms in midlife women**



628

Stress & IBS

- Issues that may influence the bowels include psychological stress, which can lead to nausea, vomiting, abdominal pain, and changes in bowel patterns or habits.
- Stress can also affect the hypothalamus-pituitary-adrenal axis (HPA axis), the ANS & the bowel directly
- The gut has a mind of its own!



629

Padhy et al 2015: ‘Irritable bowel syndrome: Is it “irritable brain” or “irritable bowel”?’

BOWEL FACTORS

Abnormal motility
 Visceral hypersensitivity
 Role of infection
 Role of inflammation
 Role of bacterial overgrowth
 Role of serotonin
 Role of brain-gut axis interaction.

BRAIN FACTORS

- Biological factors:
 Neuroanatomical factors,
 neuroimmunological factors
- Role of psyche
- Social factors: Environmental influences and role of stress



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'Vagus Nerve as Modulator of the Brain–Gut Axis in Psychiatric and Inflammatory Disorders' Breit et al 2018



'The vagus nerve represents the main component of the parasympathetic nervous system, which oversees a vast array of crucial bodily functions, including control of mood, immune response, digestion, and heart rate.'



It establishes one of the connections between the brain and the gastrointestinal tract and sends information about the state of the inner organs to the brain via afferent fibers...'



631

Take a deep breath...

- **Conclusion:** We found that a 6-week SDB intervention improved symptoms and altered rectal sensation in IBS-C patients. Moreover, SDB enhanced vagal activity. These findings suggest that the effect of SDB on IBS-C may be due to mechanisms involving autonomic responses



> Front Neurosci. 2022 Nov 4;16:1034547. doi: 10.3389/fnins.2022.1034547. eCollection 2022.

Slow, deep breathing intervention improved symptoms and altered rectal sensitivity in patients with constipation–predominant irritable bowel syndrome

Jie Liu ¹, Chaolan Lv ¹, Wei Wang ², Yizhou Huang ³, Bo Wang ³, Jiashuang Tian ², Chenyu Sun ⁴, Yue Yu ¹

Affiliations + expand

PMID: 36408402 PMCID: PMC9673479 DOI: 10.3389/fnins.2022.1034547

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What can we do for the PSNS?



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Alterations in Heart Rate Variability Associated With Irritable Bowel Syndrome or Inflammatory Bowel Disease: A Systematic Review and Meta-Analysis

Adam Sadowski, ND, MS¹, Corina Dunlap, ND, MS¹, Alison Lacombe, PhD² and Douglas Hanes, PhD¹

INTRODUCTION: Irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) are gastrointestinal pathologies affecting large numbers of the global population and incurring significant healthcare costs. Disruptions in the gut-brain axis occurring in these conditions can lead to increased inflammation, affecting gastrointestinal and autonomic nervous system function. Heart rate variability (HRV) is commonly used to assess the state of the sympathetic and parasympathetic function of the autonomic nervous system, but it remains unclear how HRV measures are associated with gastrointestinal pathologies. Here, we conduct a systematic review of the literature comparing HRV of subjects diagnosed with IBS or IBD to HRV in healthy controls (HC).

METHODS: We searched PubMed, Cochrane Library, and CINAHL (EBSCO) for eligible studies up to 2018. We included any study comparing a recognized measure of HRV between a group of patients with either IBS or IBD to a group of matched HC before any intervention. Studies were screened, and data were extracted from included articles using predefined criteria. Random effects meta-analysis was performed for each outcome, with effect size reported as the standardized mean difference.

RESULTS: There were significant differences between IBD and HC in time domain HRV and significant decreases in high-frequency power measures were also noted, in both IBS and IBD compared with HC.

DISCUSSION: Parasympathetic nervous system activity, represented through high-frequency power, seems to be lower in people with IBS and IBD, but conclusions are limited by the small number of studies that provide usable data, methodological heterogeneity, and high risks of bias in primary study methods and measures.

SUPPLEMENTARY MATERIAL accompanies this paper at <http://links.lww.com/CTG/A467>

Clinical and Translational Gastroenterology 2021;12:e00275. <https://doi.org/10.14309/ctg.0000000000000275>

D'Silva et al (2020) 'Yoga as a Therapy for Irritable Bowel Syndrome'

- 'Evidence from randomized controlled trials identified yoga as more effective compared to pharmacological treatment and equally effective as dietary interventions or moderate-intensity walking.
- Improvements were seen in both **physical health** (IBS symptom severity, gastric motility, autonomic and somatic symptom scores, and physical functioning) and **mental health** outcomes (depression, anxiety, gastrointestinal-specific anxiety, and quality of life).
- Given favorable changes in IBS-related physical and mental health outcomes, preliminary data supports yoga as beneficial in this population.'



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IBS

- Look for patterns – track everything!
- Stress & the GI/ PF
- Constipation Rx:
- Diarrhea Rx:



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'40% of people have FGIDs'



> Gastroenterology. 2021 Jan;160(1):99-114.e3. doi: 10.1053/j.gastro.2020.04.014. Epub 2020 Apr 12.

Worldwide Prevalence and Burden of Functional Gastrointestinal Disorders, Results of Rome Foundation Global Study

Results: Among the 73,076 adult respondents (49.5% women), diagnostic criteria were met for at least 1 FGID by 40.3% persons who completed the Internet surveys (95% confidence interval [CI], 39.9-40.7) and 20.7% of persons who completed the household surveys (95% CI, 20.2-21.3). FGIDs were more prevalent among women than men, based on responses to the Internet survey (odds ratio, 1.7; 95% CI, 1.6-1.7) and household survey (odds ratio, 1.3; 95% CI, 1.3-1.4). FGIDs were associated with lower quality of life and more frequent doctor visits. Proportions of subjects with irritable bowel syndrome were lower when the Rome IV criteria were used, compared with the Rome III criteria, in the Internet survey (4.1% vs 10.1%) and household survey (1.5% vs 3.5%).

Conclusions: In a large-scale multinational study, we found that more than 40% of persons worldwide have FGIDs, which affect quality of life and health care use. Although the absolute prevalence was higher among Internet respondents, similar trends and relative distributions were found in people who completed Internet vs personal interviews.

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Remember!

- All women should be evaluated for any “**red flag symptoms**” such as unintentional or unexplained weight loss, rectal bleeding, family history of bowel or ovarian cancer, iron deficiency or an anaemia, unexplained bowel habits for more than 6 weeks in people over 50 years old, or elevated inflammatory markers. Also, women aged 45 years are recommended to undergo screening for colorectal cancer.
- Additionally, given estimated 11.3–18.6% endometriosis prevalence rates in women aged over 40 years (Haas 2012), healthcare providers should consider the possibility of endometriosis in the midlife women with IBS or gastrointestinal disturbances (Chiaffarino et al 2020).
- **GASTROENTEROLOGISTS WANT TO WORK WITH YOU!!!**



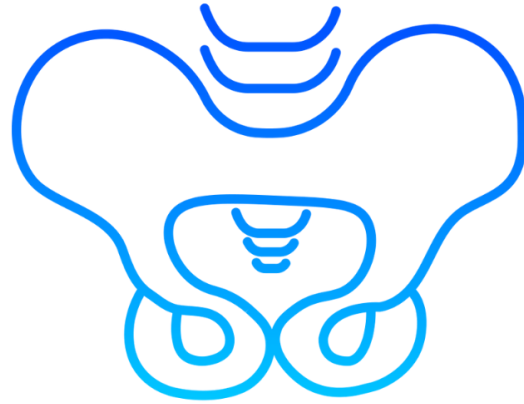
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Clinical Takeaways

- Start with the basics – take the time to breathe & connect & **EDUCATE** safely. Most people love a logical explanation, especially if it is solution based ('this is why...')
- Don't overestimate anyone's knowledge – whether patient or provider and be prepared to show your work **because the evidence is there**
- Create a sense of safety & empowerment – bowel 'movement' and restoring overall QoL – what are their barriers to living well - what **really** matters to them?



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P E L V I C O N

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Uterine Fibroids: Does Pelvic Rehab Have a Role?

Dr. Yeni Abraham



P E L V I C O N



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Dr. Yeni Abraham



P E L V I C O N

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About Me

- Passionate about all things reproductive health and infertility
- Pelvic Educator w/ Triggered Academy
- Fertility Warrior (IVF warrior)
- The Founder of the Pelvic Rehabilitation Fertility Specialist Certification program
- Mom X 2, Wife
- Lover of spicy foods and travel

Financial Disclosures

I have no financial disclosures.



P E L V I C O N

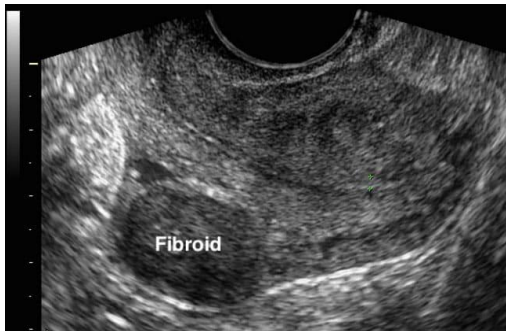
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Presentation Objectives

- Understand the Pathophysiology of Uterine Fibroids
- Recognize the Clinical Presentation of Uterine Fibroids
- Identify common symptoms associated with uterine fibroids
- Understand the diagnostic tools and techniques used to evaluate and diagnose uterine fibroids.
- Compare and contrast surgical and non-surgical treatment options for managing uterine fibroids
- Understand the Role of Pelvic Floor Therapy in Fibroid Management
- Analyze Case Studies Involving Pelvic Floor Therapy



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Common Myths About Uterine Fibroids

1. Uterine Fibroids Always Cause Symptoms
2. Uterine Fibroids Are Cancerous
3. Only Older Women Get Uterine Fibroids
4. Fibroids Must Always Be Removed Surgically
5. Fibroids Prevent Pregnancy
6. Fibroids Will Always Grow Back After Treatment
7. Diet and Lifestyle Changes Can Cure or Shrink Fibroids
8. Uterine Fibroids Always Cause Heavy Bleeding
9. Hormonal Birth Control Causes Uterine Fibroids



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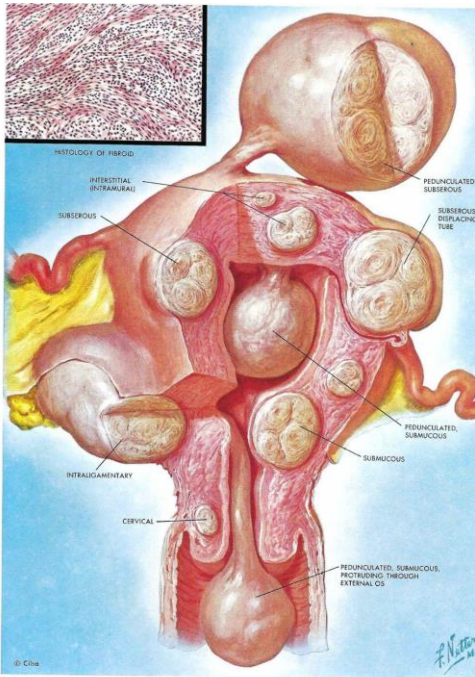
“Uterine fibroids, also known as leiomyomas or myomas, are non-cancerous (benign) growths of the uterus that often appear during childbearing years. These fibroids are made up of smooth muscle cells and fibrous connective tissue and can vary in size, from microscopic to large masses that can distort and enlarge the uterus.”

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(Stewart et al., 2017)

Based on ultrasonography, the estimated cumulative incidence of fibroids in women ≤ 50 years is *significantly higher for black (>80%) versus white women (~70%).*

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Alrahmani et al. (2017)

Background: Pathophysiology of Uterine Fibroids

- Types of Fibroids
 - a. Subserosal, intramural, submucosal, and pedunculated fibroids
- Intrauterine vs Extrauterine (location matters)



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Background: Pathophysiology of Uterine Fibroids (Baranov et al., 2019)

- Pathogenesis
 - Hormonal influences
 - Fibroids contain more estrogen and progesterone receptors than normal uterine muscle cells
 - Can improve during menopause
 - Genetic factors: tumor transformation of the smooth muscle cells
 - Exhibit familial patterns
- Role of Extracellular Matrix (ECM):
 - Abundant and disorganized ECM, including collagen, fibronectin, and proteoglycans.
 - ECM provides structural support and influences cellular behavior, promoting fibroid growth and rigidity.
- Tumorigenesis:
 - Each fibroid is monoclonal, meaning it arises from a single progenitor cell.
 - Angiogenesis: Formation of new blood vessels supports the growth and sustenance of fibroids.
- Inflammatory Processes: Inflammatory cytokines and immune responses may contribute to fibroid pathogenesis and growth.



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Clinical Presentation: Symptoms of Uterine Fibroids

- Heavy menstrual bleeding (menorrhagia)
- Urinary frequency or retention (poor bladder emptying)
- Constipation (could be chronic, or waxing and waning)
- Infertility and pregnancy complications
- Pelvic Pain and Pressure: This can range from a feeling of heaviness in the pelvic area to severe, acute pain. Large fibroids can exert pressure on surrounding organs.
- Lower Back Pain: Fibroids can cause a dull, aching pain in the lower back, particularly if they press against the nerves of the lower spine.
- Recurrent Miscarriages: The presence of fibroids, especially submucosal ones, can increase the risk of miscarriage.
- Dyspareunia: Painful intercourse may occur if fibroids are located near the cervix or lower part of the uterus.
- Abdominal Enlargement: Large fibroids can cause noticeable swelling in the lower abdomen “bloat, like appearance”



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Clinical Exam: History

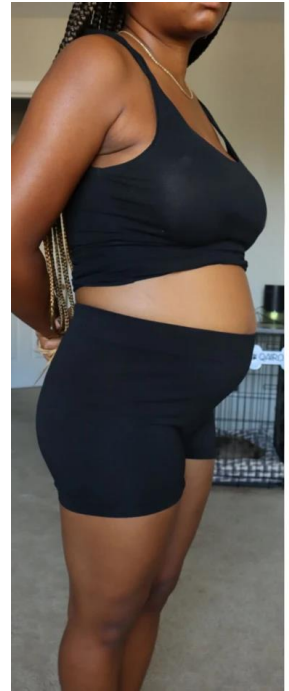
- Approximately 25% to 50% of women with fibroids are symptomatic
 - experiencing heavy menses
 - reproductive issues
 - pain
 - increased urinary frequency
 - anemia
- Thorough gyne history
- When was the last time fibroid was imaged (<1 yr not acceptable)
- Age of menarche
- # of live pregnancies, miscarriages, abortions (what stage did abortion take place and what method used)
- Types of Gyne surgery
- Outline any other PF injuries (incontinences, dyspareunia, etc.)
- Any current meds? (OBC, Pain meds, hormone replacement)



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Clinical Presentation: Physical/imaging

- Distended abdomen in standing
- May or may not feel fibroid
- Difficulty with bear-down
- Abdominal wall firm
- **SIZE MATTERS 4CM>**
- MMT of iliacus, psoas major, psoas minor, quadratus lumborum, Piriformis
- Trigger point findings
- ****Insertion of psoas minor value in treating pubic bone pain**



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“Although a high-quality ultrasonography (US) examination may be sufficient for evaluation in patients with straightforward cases of fibroids (for instance to estimate the size of a dominant fibroid), imaging evaluation is most reliably performed with magnetic resonance (MR) imaging to determine the characteristics, number, size, and location of fibroids and to assess for other pathologic conditions such as adenomyosis (15–17)”

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Key To Consider for Abdominal/PF Examination

- **Abdominal Examination**

- **Inspection**
- **Auscultation**
- **Palpation**
- **Percussion**
- Venous Flow—femoral triangle
- Assess PFM
- Venous Flow and Look for decreased sensation or increased pain
- Posterior Pelvic floor mechanical function & prolapse testing



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Differential Diagnosis



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Table 2. Differential Diagnosis of Uterine Masses

Adenomyosis	Uterine carcinosarcoma (considered an epithelial neoplasm)
Ectopic pregnancy	Uterine fibroids
Endometrial carcinoma	Uterine sarcoma (leiomyosarcoma, endometrial stromal sarcoma, mixed mesodermal tumor)
Endometrial polyp	
Endometriosis	
Metastatic disease	
Pregnancy	

Information from reference 31.

What do we do with what we found? >Prioritize What to Treat

Dysmenorrhea/Pelvic Pain

- Lymphatic drainage
- Treat underlying PF problems
- Prioritize treatment of pouch of douglas rectally
- Track cycles
- Begin treatments at end of luteal phase

Immobility

- Address Uterosacral mobility
- address any underlying scarring
- Address PF high tone and spasming
- Encourage orgasms if sexually active

Inflammation/High Sensitivity

- r/o underlying infections; do not treat without antibiotics if active infection
- lymphatic drainage to cisterna chyli
- skin rolling, down regulation of nervous system
- Graded exposure to pain triggers



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The Role of PFTs in Managing Uterine Fibroids

- PFT Interventions
 - Pelvic Floor Muscle Training (PFMT)
 - Manual Therapy Techniques
 - Myofascial Release
- Pain Management Strategies
 - Relaxation Techniques
 - Breathing Exercises
- Addressing Pelvic Floor Dysfunction
 - Pelvic Organ Prolapse
 - Urinary Incontinence
 - Dyspareunia (Painful Intercourse)

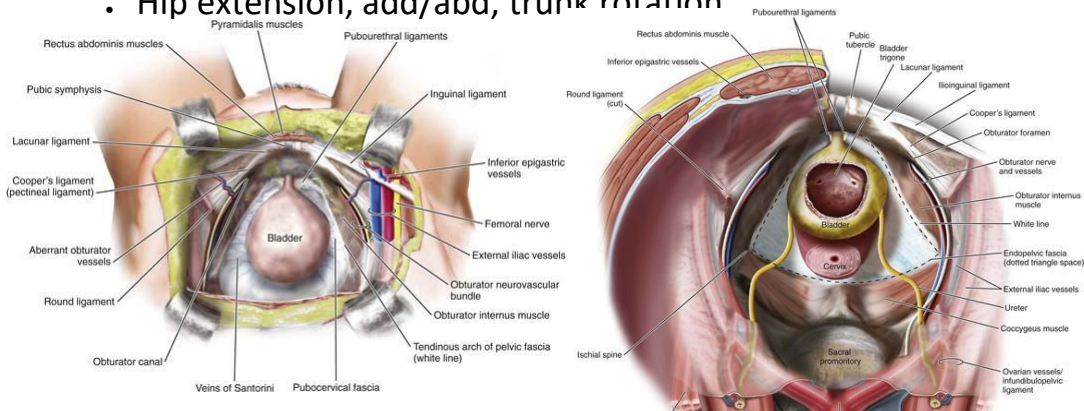
(Dancz et al., 2013)



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Treatment Approaches: Treating the Rectopubic fascia Space

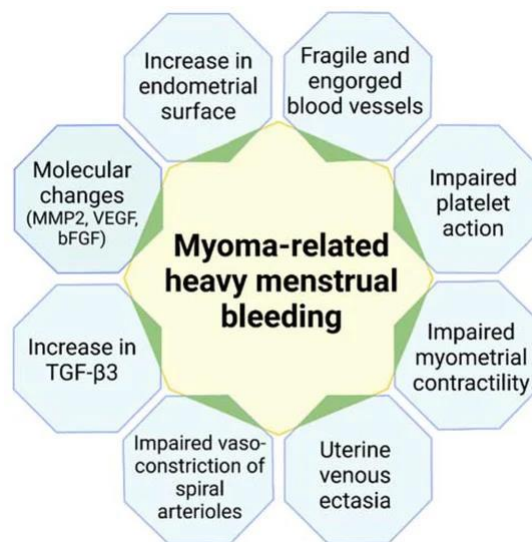
- Assess the fascia globally PROM/AROM
- Manually assess restrictions using the RA and pubic bone
- Hip extension, add/abd, trunk rotation



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Treatment Approaches: Theoretical benefits of MT and menorrhagia in fibroids

- Budding thoughts on direct manipulation of the uterus can improve prostaglandin activity improving impaired myometrial contractility
- Manual assess and mobilize uterine fundus towards restrictive area



(Dolmans et al., 2021)



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Rehabilitation Treatment How to Gauge progress



- Bladder problems improved
- GI problems (nausea, constipation improved)
- Less bloating
- Pain improves
- Penetration with intercourse improved
- Cycles may worsen initially and suddenly improve (but unlikely to remain resolved pending on size of fibroid)



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Conservative VS Surgical Management of Fibroids

Table 3. Comparison of Recommended Therapies for Uterine Fibroids

Treatment	Description	Advantages	Disadvantages	Fertility preserved?
Medical therapies				
Gonadotropin-releasing hormone agonists ³⁷	Preoperative treatment to decrease size of tumors before surgery or in women approaching menopause	Decrease blood loss, operative time, and recovery time	Long-term treatment associated with higher cost, menopausal symptoms, and bone loss; increased recurrence risk with myomectomy	Depends on subsequent procedure
Levonorgestrel-releasing intrauterine system (Mirena) ³⁸	Treats abnormal uterine bleeding, likely by stabilization of endometrium	Most effective medical treatment for reducing blood loss; decreases fibroid volume	Irregular uterine bleeding, increased risk of device expulsion	Yes, if discontinued after resolution of symptoms
Nonsteroidal anti-inflammatory drugs ³⁴	Anti-inflammatories and prostaglandin inhibitors	Reduce pain and blood loss from fibroids	Do not decrease fibroid volume; gastrointestinal adverse effects	Yes
Oral contraceptives ³⁷	Treat abnormal uterine bleeding, likely by stabilization of endometrium	Reduce blood loss from fibroids; ease of conversion to alternate therapy if not successful	Do not decrease fibroid volume	Yes, if discontinued after resolution of symptoms
Selective progesterone receptor modulators ^{35,36}	Preoperative treatment to decrease size of tumors before surgery or in women approaching menopause	Decrease blood loss, operative time, and recovery time; not associated with hypoestrogenic adverse effects	Headache and breast tenderness, progesterone receptor modulator-associated endometrial changes; increased recurrence risk with myomectomy	Depends on subsequent procedure
Tranexamic acid (Cyklokapron) ^{37,38}	Antifibrinolytic therapy	Reduces blood loss from fibroids; ease of conversion to alternate therapy	Does not decrease fibroid volume; medical contraindications	Yes
Surgical therapies				
Hysterectomy ³⁹	Surgical removal of the uterus (transabdominally, transvaginally, or laparoscopically)	Definitive treatment for women who do not wish to preserve fertility; transvaginal and laparoscopic approach associated with decreased pain, blood loss, and recovery time compared with transabdominal surgery	Surgical risks higher with transabdominal surgery (e.g., infection, pain, fever; increased blood loss and recovery time); morcellation with laparoscopic approach increases risk of iatrogenic dissemination of tissue	No
Magnetic resonance-guided focused ultrasound waves ⁴⁰	In situ destruction by high-intensity ultrasound waves	Noninvasive approach; shorter recovery time with modest symptom improvement	Heavy menses, pain from sciatic nerve irritation, higher reintervention rate	Unknown
Myomectomy ⁴¹	Surgical or endoscopic excision of tumors	Resolution of symptoms with preservation of fertility	Recurrence rate of 15% to 30% at five years, depending on size and extent of tumors	Yes
Uterine artery embolization ⁴²	Interventional radiologic procedure to occlude uterine arteries	Minimally invasive; avoids surgery; short hospitalization	Recurrence rate > 17% at 30 months; postembolization syndrome	Unknown

Information from references 32 through 42.



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Conservative VS Surgical Management of Fibroids

Nonsteroidal anti-inflammatory drugs ⁴⁴	Anti-inflammatories and prostaglandin inhibitors	Reduce pain and blood loss from fibroids	Do not decrease fibroid volume; gastrointestinal adverse effects	Yes
Oral contraceptives ³¹	Treat abnormal uterine bleeding, likely by stabilization of endometrium	Reduce blood loss from fibroids; ease of conversion to alternate therapy if not successful	Do not decrease fibroid volume	Yes, if discontinued after resolution of symptoms
Selective progesterone receptor modulators ^{35,36}	Preoperative treatment to decrease size of tumors before surgery or in women approaching menopause	Decrease blood loss, operative time, and recovery time; not associated with hypoestrogenic adverse effects	Headache and breast tenderness, progesterone receptor modulator-associated endometrial changes; increased recurrence risk with myomectomy	Depends on subsequent procedure
Tranexamic acid (Cyklokapron) ^{37,38}	Antifibrinolytic therapy	Reduces blood loss from fibroids; ease of conversion to alternate therapy	Does not decrease fibroid volume; medical contraindications	Yes

- Patients with menorrhagia as chief complaint= Tranexamic Acid, No contraindication
- Conservative management non-disruptive to PFT clinical interventions.



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Conservative VS Surgical Management of Fibroids

Table 4. Summary of Recommended Treatment Options for Uterine Fibroids

<i>Patient characteristics</i>	<i>Treatment options</i>
Asymptomatic women	Clinical surveillance ⁴
Infertile women with distorted uterine cavity (i.e., submucosal fibroids) who desire future fertility	Myomectomy ¹⁶
Symptomatic women who desire future fertility	Medical treatment or myomectomy ^{34,38,41}
Symptomatic women who do not desire future fertility but wish to preserve the uterus	Medical treatment, myomectomy, uterine artery embolization, magnetic resonance-guided focused ultrasound surgery ^{34,38,40-42}
Symptomatic women who want definitive treatment and do not desire future fertility	Hysterectomy by least invasive approach possible ^{43,44}

Information from references 4, 16, 34, 38, and 40 through 44.

- Preservation of fertility typically guides surgical decision making
- Recommended Asymptomatic women= clinical surveillance (annual imaging– MRI vs Transvaginal US)



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Interdisciplinary Approach to Fertility Care

- Gynecologist (Adeno/Endo specialist)
- Colorectal Surgeon or GI specialist
- Urologist/Urogynecologist
- Pelvic Floor Therapist
- Nutritionist
- Hormone Specialist (if not gyne)
- **Interventional Radiologist**
- Psychologist/Mental Health Counselor



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Case Study 1: Non-Surgical Management

- 38 yo AAF
- History: Diagnosed with multiple small uterine fibroids (<2cm each) 4 yrs ago
- Symptoms: Chronic pelvic pain, urinary frequency, and dyspareunia
- Treatment History: Previous Oral Birth Control with limited success
- Clinical Approach:
 - Comprehensive pelvic examination (hypertonic PF, urethral sensitivity), Transvaginal ultrasound to confirm fibroid size and location from obgyn
 - Downtraining PF muscles, visualizations, PF foam rolling vs pelvic wand HEP
 - Visceral Manipulation of bladder, kidneys and abdominal wall release– pubovesical lig
- Medical & Holistic Management:
 - PRN NSAIDs for pain relief, epsom salt baths for muscle relaxation and pain
- Dietary modifications and supplements, including iron for anemia.
- Outcomes:
 - Significant reduction in pelvic pain and urinary symptoms.
 - Improved quality of life and sexual function.
 - Decreased frequency of severe symptoms and a non–proliferative growth of fibroids over 6 months (2 visits a month).



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Case Study 2: Surgical Management

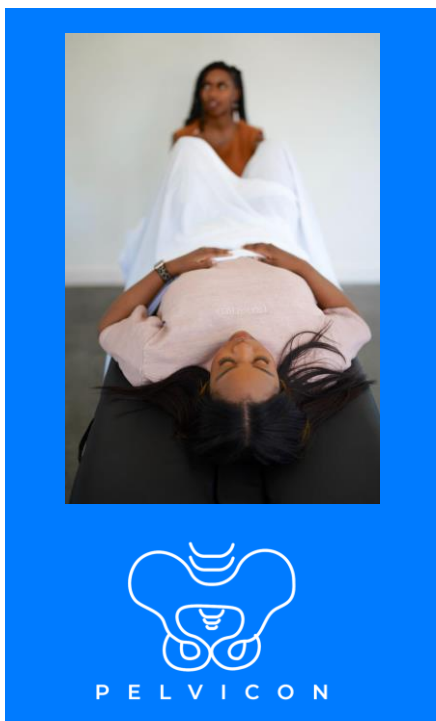
- 45 yo nulliparous AAF
- History: Large intramural fibroid causing severe menorrhagia, anemia, and pressure symptoms & Adenomyosis
- Symptoms: Heavy menstrual bleeding, pelvic pressure, pain with deep penetrative intercourse, diminished orgasm, lower back pain, and frequent urination
- Treatment History: Tried hormonal treatments and conservative management with no significant improvement. H/o hysteroscopy, myomectomy 15 yo
- Clinical Approach:
 - Detailed pelvic examination, MRI to determine the size and exact location of the fibroid, Blood tests to evaluate anemia severity
- Surgical Intervention>UFE: embolization of uterine artery
- Pre-surgical & Post-Surgical Pelvic Floor Therapy:
 - Rehabilitation: Post-surgical recovery plan including gentle pelvic floor exercises to restore muscle function.
 - Pain Management: MFR to alleviate post-operative pain and prevent scar tissue formation.
 - Strengthening and Conditioning: Progressive whole body exercises to strengthen pelvic floor muscles and improve pelvic stability.

Outcomes:

- Successful removal of the fibroid with minimal complications.
- Gradual reduction in pelvic pressure and urinary symptoms post-surgery.
- Improved muscle strength and function, leading to a return to normal activities within three months.
- Enhanced quality of life and symptom resolution.



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Key Takeaways

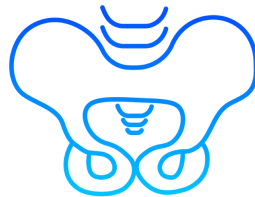
1. Discourage Natural shrinking claims
2. Pain may disappear despite increased size
3. Fibroids likely to reoccur in 5-8 yrs s/p myomectomy
4. Fibroids shrink/regress during menopause
5. Encourage pts consider myomectomy prior to TTC
6. Emphasize the importance of a multidisciplinary approach
7. Vitamin D Deficiency linked to black women with uterine fibroids

Thank you
for having me!



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Q&A



PELVICON

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Balancing Act: Navigating Hypermobility and Pelvic health

Bill Taylor, MSc PT, Grad Dip Adv
Manip Therap (Canada)



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Bill Taylor



About Me

- Physio for over 40 years
- >25 years in Pelvic Health
- Canadian trained Manual Therapist
- Special Interest in Chronic Pelvic Pain
- Owner/Director of Clinic in Edinburgh
- Visiting faculty at Edinburgh Uni
- Serves on POGP Board

672

Defining Joint Hypermobility (JH)

Ability of Joint to move beyond normal limits

Passively or actively along physiological axes of motion

Descriptor

May Exist as an isolated finding

Frequently benign

Often part of larger diagnostic Syndrome

(Simmonds et al 2007)

In Dancers, Athletes and Gymnasts considered both an asset and a risk



673

Differentiating Joint Hypermobility from Joint Instability ?

Definition: Joint Instability

Inability of a joint to control its position during movement

Arises from number of factors

- Laxity in supporting soft tissues
- Congenital/Acquired Joint Abnormality
- Inherent or acquired muscle weakness
- Neurological Disorders

Acquired GJH is usually supported by healthy normal anatomy - prior to any injury

Jl is often a prelude to potential joint injury

Symptoms

- Pain
- Swelling
- Injuries
- Lack of trust when loading
- Inherent JH individuals may present as "abnormal" or "fragile"

(Carroll,2023)



674

Jumping from Joint Hypermobility to Hypermobility Spectrum Disorders & Hypermobile Ehlers Danlos Syndrome?

Hypermobility Spectrum Disorders (HSD)

Group of conditions involving hypermobility pain and systemic disorders

HSDs and hEDS most common hypermobility conditions

Both diagnosed using International diagnostic criteria

HSDs includes individuals that don't meet hEDS criteria

Generalised HSD - G-HSD

Peripheral HSD - P -HSD - hands and feet only

Localised HSD - L-HSD -specific body region

Historical HSD- H-HSD - previously JH but aging factors reduce mobility

(Malfait et al 2017)

Hypermobile Ehlers Danlos Syndrome (hEDS)

Genetic Connective Tissue disorder

hEDS inherited autosomal disorder

13 Subtypes of EDS

hEDS is only group with presently no definitive genetic marker.....

HEDGE study is an ongoing study to obtain whole-genome sequences from 1000 individuals with hEDS

Joint Hypermobility & Joint Instability

Chronic joint pain

Skin Fragility

Genito-urinal

Gastrointestinal

Fatigue



(Malfait et al 2017)

675

How does Hypermobility Affect the Pelvic Floor?

Bowel and Bladder Control

Sexual Function

Hip Stability

Lumbar Spine Stability

Pelvic Floor Muscles in Hypermobile individuals are often working at the limit of their adaptation

Can result in an increase in tone in the PFM

Non-relaxing pelvic floor can result in

Weakness

Pain

Dysfunction

(Reijn-Baggen (2022)



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Non-relaxing Pelvic floor (PF)

Non-relaxing PF can be defined as “an increase in muscle tone related to contractile or viscoelastic components associated with contractile activity and/or passive stiffness in the muscle”

(Reijn-Baggen (2022))

Non-relaxing PF can cause

- Urological problems
- Gynecological problems.
- Gastrointestinal problems
- Sexual problems
- Chronic pelvic pain

Primary Problem - non-relaxing Pelvic Floor

Secondary Problem - an adaptation to an acute or chronic injury

- Pelvic floor injury
- Pelvic surgery
- Birth trauma
- Lumbo/pelvic trauma
- Chronic stress,
- Chronic Pelvic Pain
- Gait alteration



(Reijn-Baggen (2022)) PELVICON

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Symptoms of Pelvic Floor Dysfunction in gHDS and hEDS (Haylen et al 2010)

Urinary incontinence

Urinary frequency

Overactive bladder

Nocturia

Voiding Symptoms

- Hesitancy
- slow stream,
- incomplete emptying

Pelvic organ prolapse

Sexual dysfunction

Fecal incontinence

Constipation

Lower urinary tract pain or other pelvic pain

Recurrent urinary tract infections



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Prevalence of Pelvic Floor Dysfunction in Hypermobile Individuals

Retrospective case control study reported the risk of experiencing pelvic issues in G-HSD/EDS

Women with G-HSD and hEDS who suffer pelvic pain

- 3.1 times more likely to have hip pain
- 3.5 times more likely to have pain with vaginal intercourse
- 3.8 times more likely to have stress urinary incontinence
- 4.7 times more likely to have irritable bowel syndrome
- 7.5 times more likely to have low back pain

(Hastings et al 2019)



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Reported Pelvic floor Symptoms in Hypermobility

The literature is limited however, there is a wide range of reported pelvic floor symptoms in patients with G-HSD and hEDS

- Urinary incontinence (38 to 60%)
- POP (13 to 75%)
- Pelvic pain (13 to 75%)
- Dyspareunia (30 to 77%)
- Faecal incontinence (2 to 19%)
- Rectal prolapse (2 to 16%)

(Kcuik et al, 2022)



680

Prevalence and Causes of Urinary Incontinence in Hypermobility

There is limited information about urinary symptoms in Joint Hypermobility Syndrome.

No definitive data to support an increase rate of incontinence in Hypermobile patients

Arunkalaivanan *et al* (2009) and Jha *et al* (2007) reported urinary and faecal incontinence was significantly higher in hypermobile individuals than controls

Hypermobility syndrome may cause

- Anatomical changes to the bladder and pelvis

- Neurological changes affecting the sympathetic nerve autonomic control of the bladder

- Chronic constipation due to reduce bowel transit time

- Psychosocial Issues - Anxiety/pain



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Hypermobility and Pelvic Organ Prolapse (POP)

hEDS/HSD is associated with Pelvic Organ Prolapse

(Viet-Rubin, 2015)

Hypothesized to be associated with muscle deficits or changes in pelvic floor connective tissue

(Hafizi et al 2019)

Pelvic organ prolapse may be more severe in women with joint hypermobility syndrome

(Masterodes et al 2013)



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Causes and Prevalence of POP in Hypermobility Syndrome

Pelvic Organ Prolapse is Multifactorial

Parity

Age

Ethnicity

Estrogen deficiency

Smoking

(Carley et al 2000)

Connective tissue disorders have a higher prevalence in women (73-89%) compared to men

Been shown to predispose individuals to POP

(Kcuik, 2022)



683

Hypermobility and the Male Pelvic Floor

Men (and those assigned male at birth) with gHSD and hEDS may experience pelvic floor issues

Chronic prostatitis

Chronic pelvic pain syndrome

Urinary/faecal incontinence

Sexual dysfunction

(Cohen et al, 2016)



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Hypermobility the Pelvic Floor and Performance/High Performance Athletes

In Dance, Gymnastics, Acrobatics, Skating and Circus

Extraordinary flexibility can be the difference between Success and Failure

Hypermobility Syndrome Disorder/hEhlers Danlos Syndrome can offer an advantage in this arena

The literature reports that individuals in these areas exhibit higher than average joint flexibility
(Gupta et al 2004, Briggs et al 2009)

The negative side of hypermobility is the reported risk of injury



685

Are Dancers More Bendy Than Most ?

Prevalence of Joint Hypermobility (JH) in general population is 2-57%

Studies suggest 72 % of dance population have JH

89% of a group of elite Australian dancers presented with GJH
Also demonstrating greater hypermobility in their right leg

(Chan et al 2018)

Mobility Measurement Tools

Beighton Scale (BS)

Lower Limb Assessment Scale (LLAS)

BS reportedly overestimates hypermobility prevalence

The LLAS is specific to the lower limb and superior to the Beighton score in assessing GJH in dancers

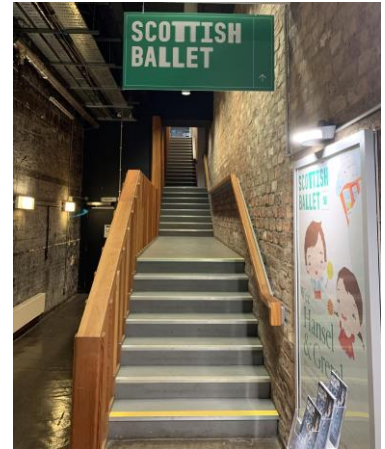


(Day et al 2011)

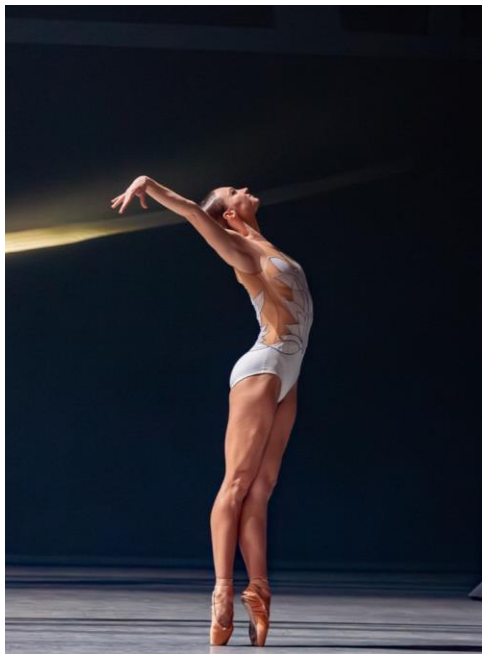


686

The funnier side of being hypermobile.....



687



Connective Tissue in G-HSD

- Weakened
- Increased elasticity
- Reduced ability to take load
 - Tensile
 - Compressive
 - Torque
- Reduced protective properties
- Reliance on Muscular support
- ? increased resting muscle tone
- Increased risk of injury
- Risk of changes in pelvic floor integrity and Injury

(Pliego-Arrega et al 2024)



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How Does G-HSD Manifest Itself?

Full- spectrum of Symptoms

Symptomless to complete disability

Repeated macro/micro trauma

Micro-subluxations

Macro-dislocations

Muscle/ligament/tendon

Synovium/cartilage damage

Accumulative imperceptible tissue damage

May result in persistent pain

Disturbed Proprioception

Musculoskeletal Traits

Pes planus

Valgus deformity

Elbows/hind feet and halluces

Scoliosis (not congenital)

Accentuated dorsal/lumbar lordosis

Deformational plagiocephaly

(Carroll, 2023)



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Signs & Symptoms

Extreme Joint ROM

Frequent joint dislocations or subluxations -often atraumatic

Soft Tissue injuries - sprains & strains

Pain/Discomfort

Pelvic Floor Involvement

Skin involvement

Fatigue

Psychological Distress

(Carroll, 2023)

Endocrine Disorders

Gastro-Intestinal Symptoms

Genito -Urinary Symptoms

Postural Orthostatic Tachycardiac Syndrome



690

Pain

Acute or Chronic

Intermittent and recurrent
Musculoskeletal pain is common

Chronic pain can be a long- term
complication

Hyperalgesia

Central/Peripheral Sensitisation

(Teran-Wodzinski, 2023)

Recent finding of high rate of small nerve
fibre neuropathy in common EDS
subtypes (Cazzotto et al, 2016)



691

Dancers, Pain and Injury

Pain considered unpleasant and associated with injury

Pain associated with exercise and training often reclassified as good

Dancers differentiate between good and bad pain

Social dimension

Be seen as hard-working and committed
(Tarr et al 2020).

Pedagogic practices reinforce dancers must continue to dance despite injury

In both Rehearsal/Performance context
(Wainwright et al, 2005)

Sitting out class or rehearsal is stigmatized

Fear of reprisal from teachers/choreographers and directors
Fear of being known as injury-prone/lazy

Dancers more worried about the consequences of **not** working through pain and injury

(Tarr et al 2020)

Acceptable to dance through pain



692

Joint Proprioception

Reduced Muscle strength associated with activity limitations in hEDS

Connection between reduce Proprioception and Muscle Strength

Not completely understood

Symptomatic individuals present with reduced proprioception

(Scheper 2014)

Position and motion sense acuity **is** affected by muscle fatigue in non dancers

Position and motion sense acuity in dancers **is not** affected by muscle fatigue

(Dieling et al 2014)



693

Strength

hEDS individuals show lower extremity muscle weakness

Quads and Hamstring strength/endurance.
Uncertain whether due to muscle dysfunction or reduced muscle mass

(Rombaut et al 2012)

A narrative review reported Resistance Training was possible and effective in hEDS population across all ages

Although concluded there is currently no definitive evidence to define standard training regimes

(Zabriske et al 2022)



Prospective RCT showed 82% reduced injury rate when dancers were prescribed a specific strength training programme

(Vera et al 2020)



694

So, How Does This Apply to the Dancer ?

Dancers are different

Spend a long time stretching

Often don't strengthen with weights

Dancers often report feeling stiff

Report they have a "good" side

Have a **sense** they are never mobile enough

Always looking for a more extreme range of motion

Stiffness has been reported as being a subjective sensation (Stanton et al 2017)

It begs the question what is end range?

Is this sense of stiffness due to increased resting tone of hip/pelvic floor muscles ?

Assessment has to consider this

Dancers need to be listened to/feel heard

As physios we need to assess injury risk

Strength

Proprioception

Pain strategies

Understanding of hypermobility



695

How to Make a G-HSD Diagnosis

LJH < 5 joints affected by JH

Single or Large joints - maybe bilateral

Inherited/iatrogenic from surgery/past trauma/training

GJH > 5 joints

Simultaneous JH in 4 limbs and axial skeleton

Often genetically inherited

5-Part Questionnaire

Beighton Score

LLAS

(Carroll, 2023)

Physical Examination

Goniometer measurement

Assessing maximal ROM

Comparisons for age and gender



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5 Part Questionnaire

(Hakim & Grahame Questionnaire)

Questionnaire with 5 questions
Short and quick
For defining Generalised- HSD
Initially developed as a screening
tool in high-risk patients.

(Hakim et al 2003)

Shown to have a high degree of
sensitivity (84%) and sensitivity
(89%)

Helpful in identifying G-HSD in
population based studies.



(Hakim et al 2004)

1. Can you now (or could you ever) place your hands flat on the floor without bending your knees?

2. Can you now (or could you ever) bend your thumb to touch your forearm?

3. As a child did you amuse your friends by contorting your body into strange shapes OR could you do the splits?

4. As a child or teenager did your shoulder or kneecap dislocate on more than one occasion?

5. Do you consider yourself double-jointed?

Endorsement of two or more questions suggests generalised joint hypermobility.

697

Beighton Score/Scale (BS)

Beighton Score

9 point scoring system
Assesses flexibility of
MCP 5th fingers
CMC joint thumbs
Elbow Extension
Knee Extension
Spinal Flexion

Positive Beighton score

≥ to 5/9 points in adults
≥ 6/9 points in children pre-puberty
≥ 4/9 points in adults > 50

(Ehlers-Danlos Association, 2024)

The Beighton score

Beighton's modification of the Carter and Wilkinson scoring system. Give yourself 1 point for each of the manoeuvres you can do, up to a maximum of 9 points.

	SCORE	
	Left	Right
1. Can you put your hands flat on the floor with your knees straight?	1	1
2. Can you bend your elbow backwards?	1	1
3. Can you bend your knee backwards?	1	1
4. Can you bend your thumb back on to the front of your forearm?	1	1
5. Can you bend your little finger up at 90° (right angles) to the back of your hand? ...	1	1
	9	



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Lower Limb Assessment Score (LLAS)

- The LLAS assesses L/L hypermobility and correlates with more global Beighton Scale
- 12 areas evaluated bilaterally

HOW TO SCORE IT:

1 point for each HM joint range

Max score of 12 for each limb

Cut of point $\geq 7/12$

Been shown to be a valid tool to identify lower limb specific hypermobility and GJH in adults

Excellent specificity

Moderate sensitivity

Good discrimination between extents of hypermobility.

(Meyer et al 2017)

Hip Flexion

Hip Abduction

Knee Hyperextension

Knee Anterior Draw

Knee Rotation

Ankle Dorsiflexion

Anterior Ankle draw

Subtalar inversion

Midtarsal Inversion

Midtarsal ABD/ADDuction

1st MPJ dorsiflexion

Subtalar pronation (weight-bearing)



699

Strength and Conditioning and the Dancer

Traditionally dancers have avoided lifting weights

Fear of hypertrophy

Negative impact on aesthetics

Fear of injury

Ideas are changing however, still permeate throughout the dance community

(Farmer et al 2021)

Data on both male and female dancers demonstrates Strength Training

Facilitates artistic and aesthetic components of dance

Reduces Injuries.

(Koutidakis et al 2005)

Recent meta-analysis reported Resistance training/Whole body Vibration Training/ Combined Conditioning Programmes

Improved aesthetic competence

Increased Lower body power

Increased Upper and lower body strength and flexibility.

(Ngo et al 2024)



700

Pelvic Floor Dysfunction in Dancers & Athletes

Thysen et al 2020 set out determine the frequency of urinary loss in elite level female athletes and dancers during daily life and sport and dance

8 Different sports + Dance

91 women

Mean age 22.8

Response rate of **73.9%**

151 women reported UI
125 during sport/dance
123 during daily activities

- o Gymnastics 56%,
- o Ballet 43%,
- o Aerobics 40%,
- o Badminton 31%,
- o Volleyball 30%,
- o Athletics 25%,
- o Handball 21%
- o Basketball 17%

(Thysen et al 2020)

Winder et al 2023

Investigated the Prevalence of Urinary Incontinence in professional dancers

An anonymous online survey including International Consultation on Incontinence Questionnaire -Urinary Incontinence Short Form (ICI-Q-UISF)

208 dancers

Dance and training Schedule > 25 hours per week

Total of 34.6% reported UI

31.9% reported Urge UI

52.8% reported SUI - cough or sneeze

54.2% reported SUI - physical activity/exercise

Pain with Sexual Activity significantly Associated with UI but effect size was not notable

(Winder et al 2023)



701

What effect does long-term Impact training have on Pelvic Floor Muscle Function ?

Krueger et al (2007) investigated effects of long term high-impact frequent intense training (HIFIT) on pelvic floor muscle function and anatomy

24 HIFIT athletes were compared to 22 non-athletic controls matched for age and BMI

3D/4D pelvic floor imaging was used to assess the PF's function and decent during specific maneuvers



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Key Findings of Krueger et al (2007)

HIFIT athletes showed

- Significantly larger pubovisceral muscle diameter
- Larger hiatal area during Valsalva Maneuver

HIFIT athletes showed

- Greater bladder neck descent on Valsalva- suggesting altered pelvic organ support

HIFIT group could increase hiatal area during Valsalva - indicating a difference in muscle distensibility- despite increased Pubovisceral muscle diameter

Suggests long-term HIFIT training leads to changes in Pelvic Floor Morphology and function which may have effect on Childbirth and stress incontinence

(Krueger et al 2007)



703

Is Increased Pelvic Floor Tone a Problem ?

In Winder's study of 208 dancers questioned about their pelvic health

A total of 34.6% of female professional dancers reported experiencing UI

Reports of pain with sexual activity and intercourse were significantly associated with presence of UI

(Winder et al, 2023)

UI/Dyspareunia can be associated with increased pelvic tone

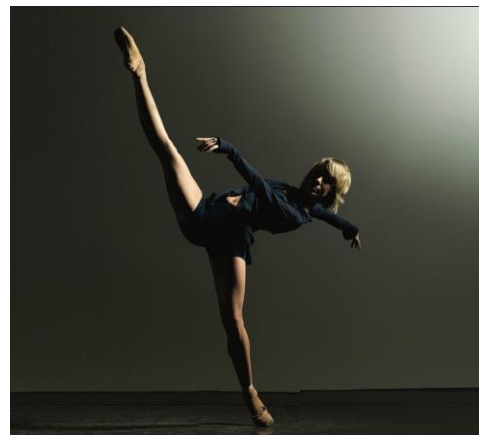
(Worman et al, 2023)

Many dancers present with symptoms of increased pelvic floor tone

Is increased tone always a problem ?

Do we need to change it if they have no symptoms and are able to function at a high level ?

There are no current studies specifically looking at Pelvic Floor Tone in dancers



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Pelvic Floor Tone

Worman et al 2020

Large systematic review

Few studies provided evidence for increased tone of pelvic floor muscles in pelvic health conditions

- Difficulties with interpretation

- Design and measurement issues/Inaccurate terminology

Reinforced by ICS report on the terminology into PF muscle assessment

(Frawley et al,2021)



705

What Can We Take From Worman's Work ?

Increased PFM tone/overactivity commonly reported in several pelvic health conditions

- Chronic Pelvic Pain

- Urinary incontinence

- Sexual Dysfunction

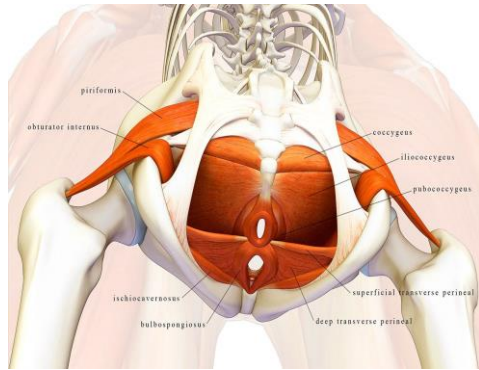
There is evidence for a link between increased PFM tone and pelvic conditions

The strength of this association is variable across different conditions and assessment methods

(Worman et al 2020, Worman et al 2023)



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The Hip-Pelvic Floor Connection

- Anatomically and Functionally interconnected
- They lie in close proximity
- PFM contribute to pelvic girdle stability – essential for hip function
- Obturator internus (OI) is an External rotator of the hip
- Obturator Internus Fascia thickens to form the Arcus Tendineus Pelvis (ATP)
- Levator Ani attaches to the ATP
- OI provides structural support for pelvic floor

(Muro et al 2023)



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So, What Does This Mean When Working With Dancers ?



Recognize specific movement demands of dancers

Including repetitive impact and extreme ranges of motion

Stylized positions with excessive hip External Rotation (Turn out)
Often with buttock clenching

There is relationship between the pelvic floor and hip function

First/Fifth positions may result in increased activity in hip and pelvic floor muscles

708

Assessing A Dancer With G-HSD and Pelvic Floor Dysfunction

Lumbar Spine Range of Motion

Relative Flexibility between Lumbar Spine Hips and Pelvis

Diaphragm tension/Breathing Strategy

Intra-abdominal pressure-control deficits

May overload the PF

Strength test (Dynamometer)

Hamstrings/Quads

Add/ABDuctors

Hip Flexor/ Extensors

Hip Int/Ext Rotators

Pelvic Floor assessment

Muscle strength

Muscle contraction

Muscle relaxation

Multi-plane functional dance movement assessment

Splits

Jumps

Sissonnes

Temp leve

Arabesque



709

How Do We Treat Them?

Multidisciplinary Treatment approaches

Improves patient satisfaction and
Increases adherence to treatment

(Hwang 2013, Ferrari et al 2023)

Spinal/peripheral joint mobilization

Movement Re-education

Muscle Function - contract/relax

Pelvic floor manual therapy of non-relaxing pelvic floor

Pelvic Neural de-sensitisation/mobility

Breathing Re-education

Loading

Pelvic Floor Muscle Retraining

Strength

Power

Rate of force Development

Endurance

Functional Strength Training

Functional Return to dance Programme

Psychological Programme/Support




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Working with dancers is challenging and
— rewarding - you just need to keep them —
out of your sink.....



711



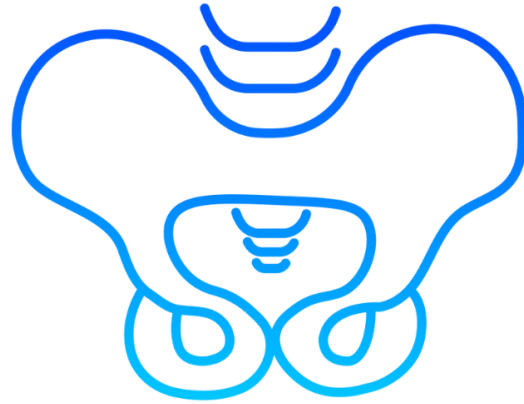
Bill Taylor



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Thank you!

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Tucking and Binding: Unpacking the Role of Pelvic Rehab in Gender Affirming Care

Alexandra Hill, PT, DPT, OnCS,
WCS, CLT-LANA

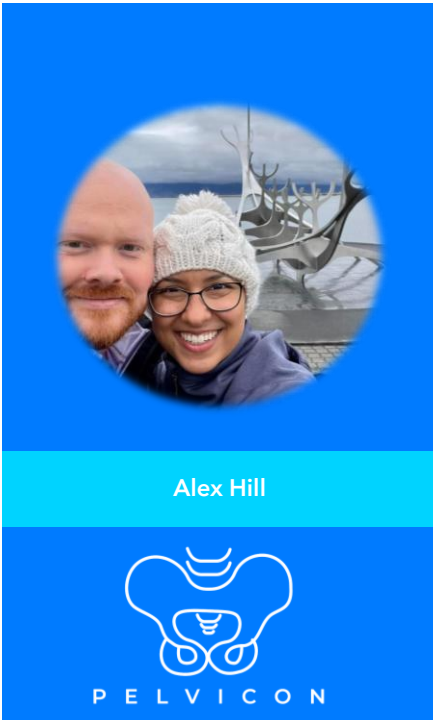


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About Me



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Disclosures

- Owner of OncoPelvic PT, LLC
- Contractor with Tactile Medical
- Affiliate with Amazon, Intimate Rose, Soul Source Therapeutics, The Pelvic People, Prairie Wear, BrightLife Direct



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Objectives

By the end of this course, the learner will be able to:

1. Discuss common musculoskeletal impairments related to binding and tucking
2. Describe rehab interventions for musculoskeletal impairments related to binding and tucking



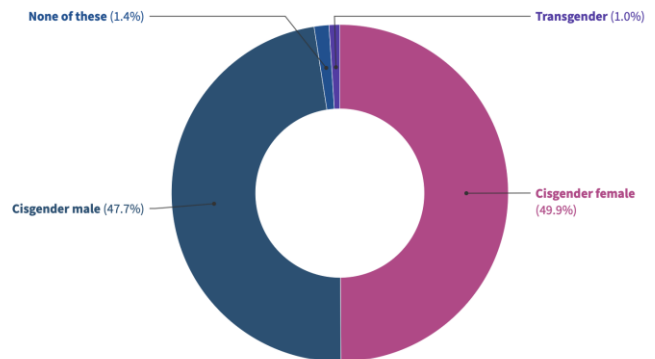
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Why do we need to talk about this?

- Approximately 1.03% of the U.S. adult population, or 2.6 million Americans, identify as transgender.
- The majority of transgender and gender nonconforming individuals participate in some type of gender affirming practice



The Williams Institute. How Many Adults and Youth Identify as Transgender in the United States (June 2022) , US Census Bureau Household Pulse Survey, 2023



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‘Transgender is a broad term that can be used to describe people whose gender identity is different from the gender they were thought to be when they were born. “Trans” is often used as shorthand for transgender.’



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<https://transequality.org/issues/resources/understanding-transgender-people-the-basics>



719

Terminology

National Center for Transgender Equality

- Trans man = assigned female at birth (AFAB), but identifies as a man
- Trans woman = assigned male at birth (AMAB), but identifies as a woman
- **Gender identity** = internal knowledge of your gender
- **Gender expression** = how a person presents their gender on the outside.



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US Transgender Survey - 2022

James 2024

- Nearly **one-quarter of respondents (24%)** did not see a doctor when they needed to in the last 12 months *due to fear of mistreatment.*
- Of those who saw a health care provider within the last 12 months, **nearly one-half (48%)** reported having at least one negative experience because they were transgender, *such as being refused health care, being misgendered, having a provider use harsh or abusive language when treating them, or having a provider be physically rough or abusive when treating them.*



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US Transgender Survey - 2022

Nearly all respondents (94%) who lived at least some of the time in a different gender than the one they were assigned at birth reported that they were either "a lot more satisfied" (79%) or "a little more satisfied" (15%) with their life.

James 2024



722

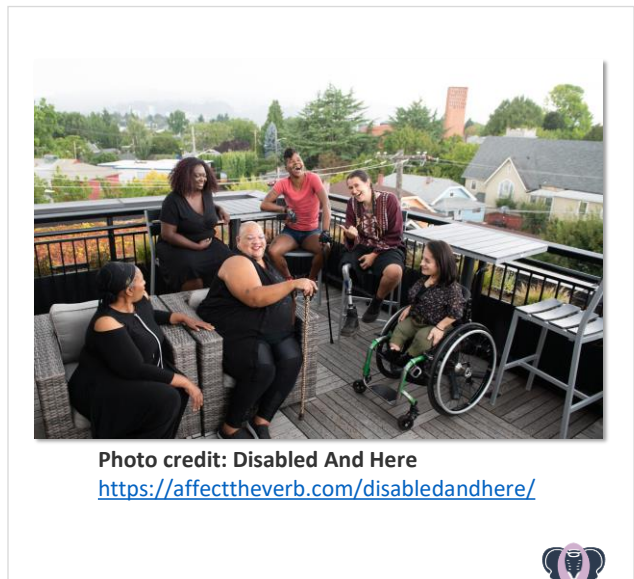


Photo credit: Disabled And Here
<https://affecttheverb.com/disabledandhere/>



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Gender Affirming Practices

Surgery

Hormone therapy

Pronouns → driver's license and passport

Appearance

Clothing



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<https://enfemmestyle.com/collections/gaffs/products/comfort-stretch-tucking-brief?variant=44870992101598>



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Tucking

- Positioning the external genitalia to conceal them (Deutsch 2018)
- May be used by those who identify as trans women, trans femme, gender nonconforming, nonbinary, agender (Dornheim 2017)
- Nearly 75% of transfeminine individuals practice tucking and almost half perform it for greater than 17 hours per day (Malik 2024)
- Goals:
 - Flat front to align with desired body image
 - Allows for tight fitted clothing
 - Less anxiety about genitals showing in public and social settings



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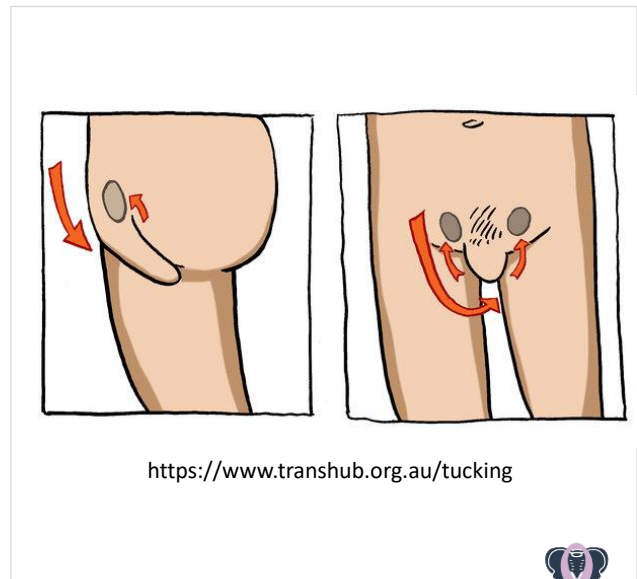
Tucking Methods

- Testicles moved into inguinal canal
- Scrotal tissue wrapped around the penis
- External genitalia moved posteriorly in perineal area
- Use material to secure the position of tissues



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<https://www.transhub.org.au/tucking>



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Tucking Materials

- Medical and Elastic tape
- Snug underwear
- Gaff (tucking underwear)



"How To Use Tape for MtF Tucking"
-Trans Missie, Untag



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Tucking Considerations

- Can be time consuming
- Need to re-position and re-secure every time the bathroom is used
- Increased risk of odor, yeast infection due to sweat and moisture
- Need to reduce hair when taping (shave, laser hair removal, etc)
- Injury to skin from tape
- Pain and discomfort



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Tucking Physical Effects

- Skin injury: mechanical injury, dermatitis, maceration, folliculitis
- Infections: UTI, prostatitis, epididymo-orchitis
- Testicular, penile, and erectile pain
- Hip and groin pain, limited hip range of motion
- Urinary dysfunction
 - Urinary trauma
 - Urinary reflux
 - Prostatism
 - Urinary irritative symptoms: Nocturia, frequency, urgency, UUI
 - Urinary obstructive symptoms: Hesitancy, decreased stream, terminal dribble, urinary retention



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Tucking Subjective Questions

- PMH, PSH, Medications
- Social history and safety questions
- Gender affirming practices
- Tucking process
 - Materials used
 - Tucking schedule

- Symptoms
- Symptoms present before tucking?
- Fluid intake, bathroom habits
- Goals for rehab



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Campbell et al 2019



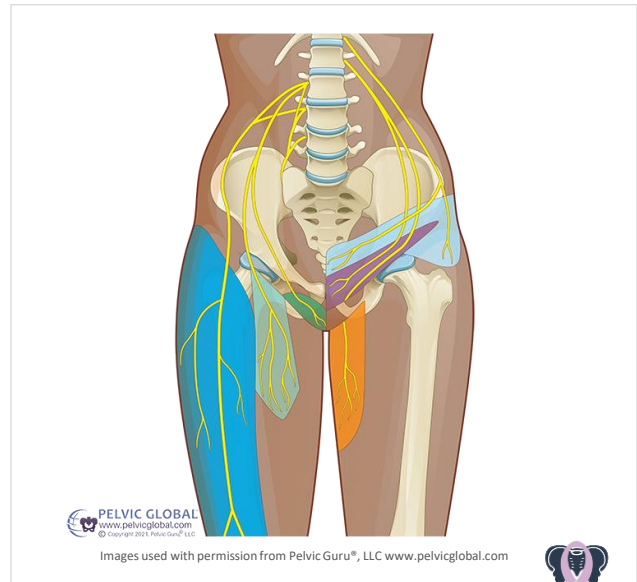
730

Tucking Objective Examination

- Hip range of motion, flexibility, and strength
- Skin health
- Sensation and nerve testing
- External structure palpation: iliopsoas, psoas, iliacus, rectus femoris, adductors, inguinal ligament, penis, scrotum, testicles, pelvic floor muscles, obturator internus
- Pelvic exam



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Tucking Rehab Interventions

Education

- Tucking schedule → shorter tucking periods
- Less tight tucking
- Bladder health
- Skin care
 - Monitor skin daily
 - Use absorbent, natural fabrics
 - Safe tape use including application and removal
 - Applying barrier creams



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Tucking Rehab Interventions

Therapeutic Exercise and Manual Therapy

- Pelvic floor muscle training
- Hip mobility
- Address soft tissue restrictions

Medical

- Nerve modulating medications for neuropathic pain (Zevin 2016)
- Gender affirming surgeries



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Binding

- Any activity that involves the compression of breast tissue in order to create a flatter appearance of the chest (Hudson 2004)
- May be used by those who identify as trans men, trans masculine, gender nonconforming, nonbinary, and agender
- 87% of trans masculine individuals have used chest binding (Jones 2015)
- Goals:
 - Flat chest to align with desired body image
 - Less anxiety about breast tissue contour showing in public and social settings



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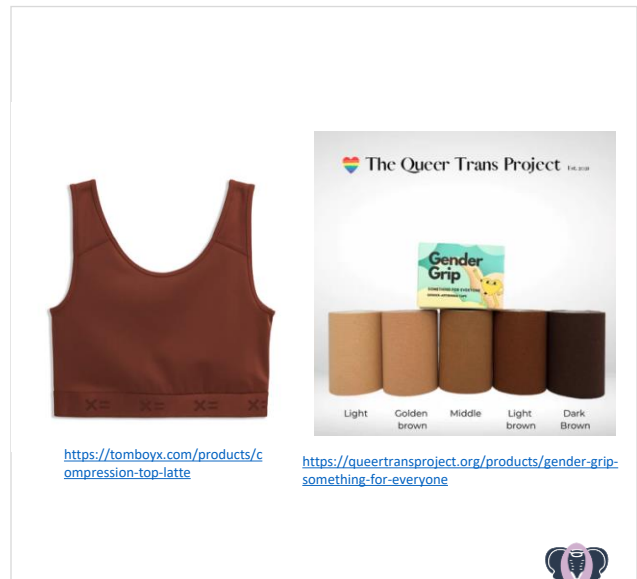
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Binding Methods

- Binders
- Sports bras
- Shirt layering
- Elastic bandages
- Elastic tape
- Athletic compression wear
- Duct tape or plastic wrap



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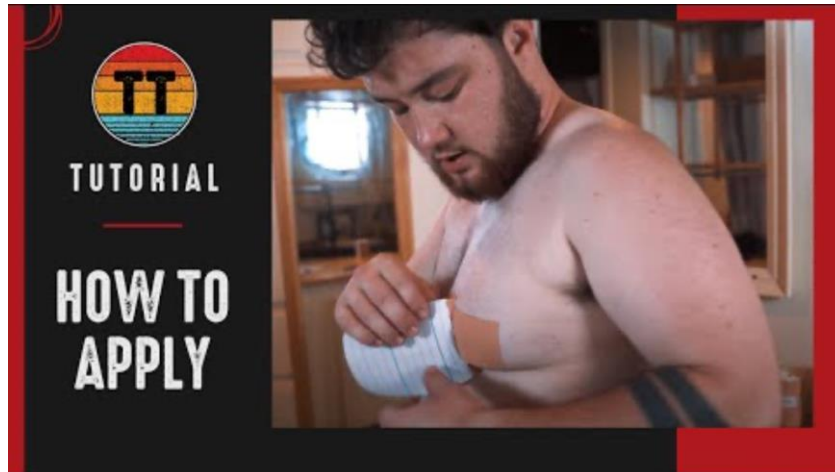
<https://tomboyx.com/products/compression-top-latte>

<https://queertransproject.org/products/gender-grip-something-for-everyone>



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TransTape Application Tutorial: Officially Aaron C



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Binding Physical Effects

- Back, chest, rib, or shoulder pain
- Poor posture
- Shortness of breath
- Overheating
- Itching, skin irritation

- Rib fractures
- Rib or spine changes
- Shoulder joint "popping"
- Muscle atrophy
- Numbness
- Headache
- Fatigue



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Campbell et al 2019



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Binding Subjective Questions

- PMH, PSH, medications
- Social history and safety questions
- Gender affirming practices
- Binding process
 - Hours per day
 - Materials used
- Symptoms
- Symptoms present prior to binding?



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Binding Objective Exam

- Posture
- Breathing mechanics and rib movement
- C and T spine and shoulder range of motion
- Upper quarter strength testing
- Sensation
- Skin health



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Binding Rehab Interventions

Education

- Binding schedule recommendations (*if safe*)
 - Up to 8 hours per day
 - Take breaks throughout the day
 - Don't wear at night
 - Avoid wearing while exercising or use less constrictive binding
 - Have "off-days" from wearing binding
- Avoid elastic bandages, plastic wrap, and duct tape
- Good skin care
 - Make sure skin is completely dry before putting on binder
 - Use a binder with breathable fabric



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Binding Rehab Interventions

Therapeutic exercise

- Mobility and strengthening exercises targeting spine, ribs, chest, back, shoulders, and neck
- Postural exercises
- Breathing exercises

Manual Therapy

- Joint mobilizations
- Soft tissue mobilization



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Take Aways for the Clinic

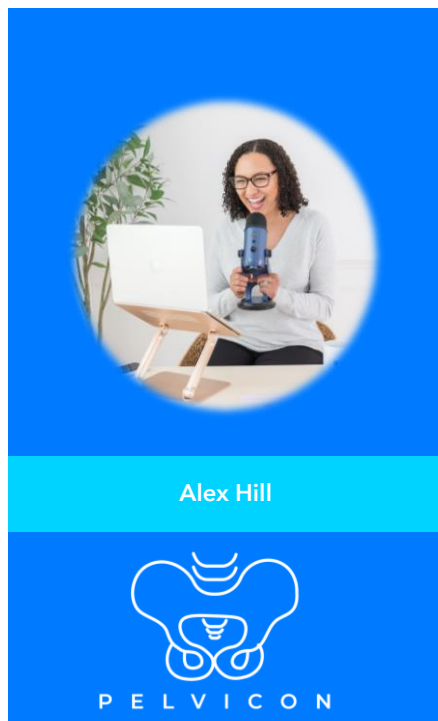
- Reflect on what words, education, body language, examination procedures, and exercises you're using that may trigger gender dysphoria
- Allow extra time during your session for removing and placing materials for binding and tucking
- Ask, don't assume, what's safe and realistic for the patient



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Thank you!

Contact: hello@oncopelvicpt.com



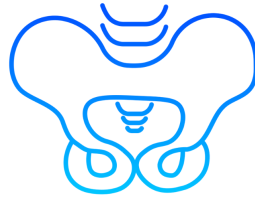
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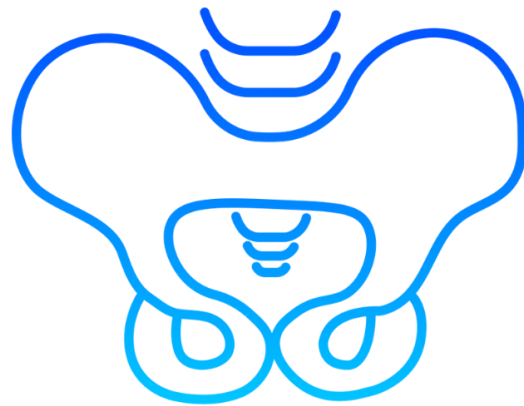


Q&A



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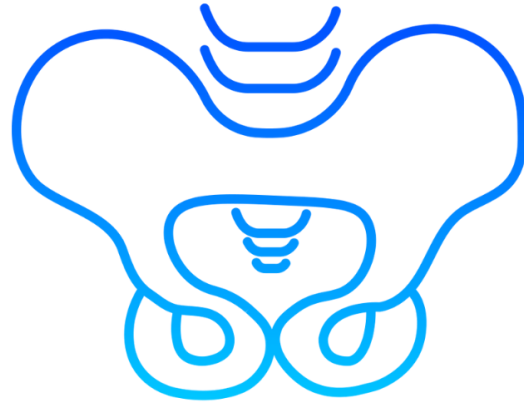
Atlanta, GA :: Crowne Plaza Hotel

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