

Pelvic Physical Therapy Distance Journal Club

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A model identifying characteristics predictive of successful pelvic floor muscle training outcomes among women with stress urinary incontinence. Brooks KCL, Varette K, Harvey MA, et al. *Int Urogynecol* 2021; Mar 32(3):719-728. Doi:10.1007/s00192-020-04583z.

Introduction: While there is strong evidence suggesting PFMT should be first-line treatment for SUI, only about half of those with SUI are cured. Being able to predict who would (and would not) be successful with PFMT may help to improve outcomes, streamline treatment, and reduce costs to the healthcare system. Previous predictive models have inconsistent findings, and often use tools that are not clinically accessible.

Aim/Primary Aim: Creation of a “robust and practical predictive model” of who will be successful with PFMT.

Study Design/Study Format: Prospective Interventional Cohort Design

Methods:

- Recruitment and data collection with a concurrent RCT investigating pre/post op physiotherapy on surgical outcomes for women with SUI, as well as participants outside the other study: <https://pubmed.ncbi.nlm.nih.gov/33660001/>
- **Participants:** n=77 women with SUI who were ≥ 18 y/o
 - **Inclusion criteria:** predominant SUI with or without UUI or nocturia (no more than one UI event assoc with urgency)
 - **Exclusion criteria:** currently pregnant or pregnant within the last year, fecal incontinence, neuro impairments, connective tissue disorders, known or suspected detrusor overactivity, pelvic surgeries to treat SUI, known POP
 - **Baseline assessments:**
 - ICIQ-SF, SF-36, ICIQ-FLUTS, 3-day bladder diary
 - Bladder volume between 300-400 ml, 30-min pad test (excluded if dry)
 - PFM strength (modified oxford scale)
 - PFM tone (+3 to -3)
 - 2-D and 3-D US assessment of urogenital morphology
 - 3D endoprobe at external urethral meatus to visualise entire vol of urethra
- PT Intervention
 - 1. 6 x face-to-face sessions over 12 weeks: 1/week for 3 weeks, 2 x every 2 week appointments, then 1 appointment after 4 weeks
 - Intravaginal EMG biofeedback assisted PFMT plus taught the knack
 - 2. Home exercise program
 - 3 sets of 10 max PFM contractions per day, with complete relaxation after each PFC (much more detail in appendix 1, 4 types of contractions given)
 - Gradually progressed through the program from supine, to sitting to standing.
- Follow-up Assessment

- Within 2 weeks of final appointment participants completed another 3 day bladder diary, completed the ICIQ-UI-SF, and return to clinic for repeat of all assessments.
- Same research physiotherapist completed this as the baseline assessment and remained blinded as to whether participants received the physio intervention.

Results/Discussion:

- **Cure Rate**

- Cure defined as pad weight of <2g on standardized pad test (same as Dumoulin et al., 2011)
- n = 38 (49%) were deemed cured. This is a vital statistic as it corresponds with evidence-based expectations of outcomes for SUI when best practice PFMT is undertaken.
 - Cochrane (Dumoulin et al., 2018): ~50% cured, ~70% cured or improved

- **Factors that appear to predict success with PFMT:**

- Those who were cured with PFMT intervention had **better pelvic organ support**
 - Higher bladder neck height (from the levator plate) in quiet standing (p <0.00) had the most predictive value, they also looked at
 - BN height at rest in supine, during MVM (max valsalva/bearing down) in supine, levator plate length (LPL) during coughing in supine and during MVM in standing, levator hiatus circumference at rest in supine and in quiet standing
 - Those who were cured with PFMT intervention had **less urethral mobility**
 - Less bladder neck (BN) descent during a cough in supine and standing
- Those who were cured with PFMT intervention had **LOWER severity** per ICIQ-SF and the baseline pad test SEVERITY OF SUI

Severity of SUI	Cured	Not Cured	p-value
ICIQ-SF (0-21)	11.3	13.4	0.03
Baseline Pad Weight (g)	11.7g	29.7g	0.00

- Women who “were cured had higher PFM tone (p = 0.01) than those who were not cured with the intervention,” however, PFM tone was removed as a predictive variable “because of poor contributions to the model fit”.
 - The authors plainly state in the discussion that there is a lack of subjectivity or sensitivity to digital palpation of PFM tone
- **No significant differences (factors that DO NOT affect success with PFMT):**
 - Demographic factors that did NOT predict failure: Age, BMI, parity, smoking, postmenopausal, HRT, h/o hysterectomy
 - Physical factors that did NOT predict failure:
 - Urethral morphology (cross sectional area of urethral wall and urethral length): no differences noted between those who did and did not respond

- PFM strength and presence of LAA (levator ani avulsion) showed no between group differences
 - *Only 5 subjects had LAA*
- Logistical regression equation created for predicting success with PFMT:

$$0.2049 \times (\text{BN position in mm}) - 0.1381 \times (\text{ICIQ-SF}) \geq 1.0812$$

Study Limitations: n=77; levator plate is not a fixed landmark (limited viewing angle on US forces the measurement of BN height to be relative to this); measures of bladder neck dilation not included; f/u assessments short-term (only 2 weeks post-Tx)

Conclusion/Summary:

- Two significant predictors were found to predict who will (and won't) respond to PFMT:
 - Bladder neck height in a quiet standing position (higher BN height, better response)
 - Self-reported SUI severity (lower severity, better response to PFMT)

Clinical Application:

- Self-reported SUI severity is a measure that is regularly and easily gathered that can predict who will make it to "cured" in order to help manage expectations, suggest those with increased fascial disruption may be candidates for pessary or other intervention?

Discussion Questions

- LA factors (PFM strength, levator morphology: LAA and LA thickness) did NOT predict failure, was this a surprise? Was there anything else that was surprising or not?
- The authors wrote that 2 variables (LPL at end MVC and BN height at end MVC) were found to be "indicative of PFM function". There were between group differences, but is this a valid conclusion to draw? Do we know that these differences in fact indicate differences in *function*?
- The introduction stated this predictive model may reduce healthcare expenses (presumably through individuals who may not be "cured" not receiving treatment). So, if someone presents to clinic who may be predicted to not be cured by PFMT (they have higher severity of SUI and lower BN height), does this mean we withhold Tx?
- Women who "were cured had higher PFM tone (p = 0.01) than those who were not cured with the intervention," however, PFM tone was removed as a predictive variable "because of poor contributions to the model fit". How do you think tone *could* play a role in whether or not someone will respond to PFMT

Other References:

- For more on urethral hypermobility vs ISD: ICI Incontinence 7, chapter 2 pathophysiology, Page 277
- Dumoulin C, Cacciari LP, Hay-Smith EJC. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. Cochrane Database of Systematic Reviews 2018, Issue 10. Art. No.: CD005654. DOI: 10.1002/14651858.CD005654.pub4. Accessed 03 July 2023.
- McLean L, Charette M, Varette K, et al. Pelvic floor muscle training as an adjunct to a midurethral sling: a single-blind randomised controlled trial. Int Urogynecol J. 2022;33(4):809-819. doi:10.1007/s00192-020-04668-9