Physical Therapies for Urinary Incontinence: from the Young Adult to Elderly Patient

W15, 29 August 2011 14:00 - 17:00

Start	End	Topic	Speakers
14:00	14:05	Introduction	• Melanie Morin
14:05	14:25	Prevention and treatment of prenatal and postpartum urinary incontinence	• Melanie Morin
14:25	14:30	Questions	All
14:30	14:55	Physical Therapy for urinary incontinence in men	• Grace Dorey
14:55	15:00	Questions	All
15:00	15:25	Physical therapy for urinary incontinence in the elderly	• Jacqueline de Jong
15:25	15:30	Questions	All
15:30	16:00	Break	None
16:00	16:25	Other treatment strategies	• Ruth Lovegrove Jones
16:25	16:30	Questions	All
16:30	17:00	Discussion	All

Aims of course/workshop

The aims of this workshop are:

1. To present an overview of evidence for pelvic floor physical therapy in the prevention and treatment of pre and postnatal urinary incontinence.
2. To present an overview of evidence based physical therapy for urinary incontinence in men.
3. To present an overview of evidence based physical therapy for urinary incontinence in the elderly.
4. To discuss new emerging therapies for urinary incontinence such as postural and motor control approaches and discuss the evidence associated with these strategies.

Educational Objectives

This interactive workshop, presents updated evidence for the role of physical therapy (PT) in the conservative management of urinary incontinence (UI). Various modalities of PT (pelvic floor muscle exercises, biofeedback, electrical stimulation and vaginal cones) have been used in the prevention and treatment of incontinence for many years; however, with the ever-expanding literature on PT, clinicians now face many challenges when trying to identify effective interventions. Moreover, there is an emergence of alternative treatment strategies such as postural and motor control approaches and it is important to discuss the potential benefits and evidence supporting these approaches. This previously successful ICS core workshop provides the opportunity for participants to update their research and clinical skills in the conservative management of UI. These state-of-the-art lectures will be presented by specialists involved in evaluating physical therapy effectiveness, with sufficient opportunities for audience participation, group discussion and problem solving.

Prevention and treatment of prenatal and postpartum urinary incontinence

Mélanie Morin, PT, Ph.D.

Overview of the pathophysiology of pre- and post-natal urinary incontinence

It is increasingly recognized that trauma to the pelvic floor muscles (PFM) can occur during childbirth, manifesting as a muscle injury, a rupture of the connective tissue, a nerve injury, or all three (Koelbl et al., 2009). Perineal trauma during vaginal birth occurs in 30% to 77% (McCandlish et al., 1998; Albers et al., 1999; Mayerhofer et al., 2002). The rates of trauma are especially high among primaparous women (Albers et al., 1999). Some consequences of these traumas are perineal pain and dyspareunia in the short and medium term (Albers et al., 1999; Barrett et al., 2000). It should be underlined that pregnancy in itself is also reported to play an important role in pelvic floor muscle (PFM) injury and weakening (Koelbl et al., 2009). If permanent, these injuries have a high potential to jeopardize urinary continence.

Physiotherapy interventions for the prevention and treatment of pre- and post-natal urinary incontinence

A systematic review of the effectiveness of pelvic floor muscle training (PFMT) for preventing and treating prenatal and postpartum urinary incontinence has been conducted (Hay-Smith et al., 2008). The 16 trials showed that, following PFMT, women were 56% and 50% less likely to report urinary incontinence than controls in late pregnancy and early postpartum, respectively (Hay-Smith et al., 2008). Women seemed to benefit more from intensive and supervised PFMT (Hay-Smith et al., 2008). Anecdotally, some researchers and clinicians were afraid that antenatal PFMT could be associated with adverse delivery outcomes such as prolonged second-stage labor, assisted or caesarean delivery, episiotomy and perineal tears. However, the study by Salvesen et al. (2004) put an end to that presumption. They showed a reduction in the episiotomy rates and length of the second stage of labor in women in the PFMT group. Current research has focused mainly on primiparous women and more studies will be required to confirm this preventive effect in multiparous women and over the long term (Hay-Smith et al., 2008).

Consistent with the findings of the Cochrane review of PFMT for treatment of urinary incontinence in women (Dumoulin et al., 2010), it appears that PFMT is an effective treatment for urinary incontinence in postnatal women (Hay-Smith et al., 2008). It has been shown that, compared to controls, women at 3 months postpartum are 20% less likely to have SUI after treatment (Hay-Smith et al., 2008). Dumoulin et al. (2004) have reported a cure rate of 74% after only 8 weeks of treatment. These treatments were multimodal, including biofeedback, electrical stimulation as well as strength and coordination training (knack), which may have contributed to higher effectiveness.

Predictive factors increasing or interfering with the effectiveness of PT.

Few studies have assessed the factors predicting the success of PFM exercises in women postnatally. Glazener et al. (2001) found that neither the type (SUI or mixed UI) nor the severity of the UI at baseline predicted the outcome immediately after an intervention. Furthermore, in a 6-year follow-up study by the same authors, Glazener et al. (2005) determined that the outcome could not be predicted by UI type, severity, or

whether or not women reported a subsequent delivery. Dumoulin et al. (2011) investigated whether pre-treatment PFM parameters can predict the success of physiotherapy treatment. They reported that a lower pre-treatment PFM passive force and greater PFM endurance could predict the successful outcome of physiotherapy treatment in women with persistent postpartum SUI (Dumoulin et al., 2011). They argued that the muscle deficits targeted in their treatment may explain these predictors. Since their exercise program did not target PFM, women with a higher initial endurance had a greater chance at achieving a successful treatment outcome. Identification of the patients who may benefit more from PFM exercises is an important issue that should be further addressed in future research.

Perineal massage for preventing perineal trauma and incontinence

A Cochrane review was undertaken to evaluate the effects of antenatal perineal massage on preventing perineal trauma at delivery. Based on four trials, the review concluded that antenatal perineal massage was associated with an overall reduction of the incidence of trauma requiring suturing (reduction of 9% to 17%) (Beckmann et al., 2006). Moreover, women practicing perineal massage were less likely by 16% to have an episiotomy (Beckmann et al., 2006). There was an overall 32% reduction in perineal pain reported by women randomized to perineal massage (Beckmann et al., 2006).

Instrumented antenatal massage using the Epi-No® has shown promising results: it has been associated with a reduction in the rate of episiotomy and an increase in the rate of intact perineum at delivery (Hillebrenner et al., 2001; Kok et al., 2004; Kovacs et al., 2004; Ruckhaberle et al., 2009). There is presently a large study by Shek et al. (2010) under way to further investigate the effectiveness of the Epi-No on perineal lesions and pelvic floor dysfunction outcomes such as incontinence.

Recently, perineal massage during delivery in the second stage of labor, using Vaseline, was shown to increase the likelihood of perineal integrity and reduce perineal traumas (episiotomy and tears). Hence, it seems that perineal massage may be an effective way to preserve an intact perineum in labor (Geranmayeh et al., 2011).

Larger randomized controlled trials are required to properly evaluate the effectiveness of manual and instrumented antenatal massage as well as massage during delivery for preventing perineal lesions. Most importantly, the impact of these interventions on continence needs to be investigated (Beckmann et al., 2006).

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Physical Therapy for Male Incontinence

ICS Glasgow

Professor Grace Dorey PhD FCSP

Deep pelvic floor muscles

• Pubococcygeus	draws tail under
• Iliococcygeus	coccyx forwards
• Ischiococcygeus	wags tail
• Puborectalis	ano-rectal angle

Superficial pelvic floor muscles

• Ishiocavernosus	penile rigidity
• Bulbocavernosus	penile rigidity pumps ejaculate prevents PMD
• Anal sphincter	controls faeces

Conditions treated by physical therapy

Urge urinary incontinence

Stress urinary incontinence

Post micturition dribble

Prevalence of urinary incontinence in men

3.6% in men 45 years of age to
28.2% in men 90 years and older

Britton et al 1990
Malmsten et al 1997
Brocklehurst 1993
Thomas et al 1997

Prevalence of urinary incontinence after TURP

Glazener et al 2011

- 1203 / 2590 (46%) of men had incontinence at 6 weeks after TURP

In intervention group:

- 67% stress incontinence
- 85% urge incontinence
- 69% post micturition

Prevalence of urinary incontinence after Radical prostatectomy

Glazener et al 2011

- 691 / 740 (93%) of men had incontinence at 6 weeks after Radical prostatectomy

In intervention group:

- 84% stress incontinence
- 20% urge incontinence
- 63% post micturition

Predictor of Post Prostatectomy Incontinence

- Pre-op erectile dysfunction p=0.024
- Age p=0.759
- Nerve sparing p=0.504

Wille et al 2007

Subjective assessment

- Personal details
- Duration and severity of symptoms
- Amount and frequency of leakage
- Appliances or pads
- Medical and Surgical history
- Neurological problems
- Bowel activity
- Sexual dysfunction
- Motivation and functional factors

Objective assessment

Informed consent
Chaperone
Supine lying & knees bent with paper sheet
Skin condition infection, abnormalities
Ability to tighten anus
Perform penile retraction and scrotal lift
Leakage on coughing
Able to prevent leakage on coughing

Objective assessment

- Palpation
  - Sensation
  - Pain
  - Reflexes
- Digital anal examination
  - Strength
  - Endurance
  - Fast fibres
  - Puborectalis

Assessment of PFM strength

Dorey 2003

- 0 = nil
- 1 = flicker
- 2 = weak
- 3 = moderate Movement of PR muscle
- 4 = good PR resistance
- 5 = strong Strong PR resistance
- 6 = v strong Unable to withdraw finger

Treatment for stress incontinence

- Patient education Model of male pelvis
- Patient specific pelvic floor muscle exercise
- The knack
- Quantity of fluid advice

Fluid Advice Malone-Lee 2010

- Thirst is the most accurate judge of fluid balance and cannot be bettered
- Pushing fluids dilutes natural antibodies and natural antibiotics
- Drinking too little does not allow filling of 300-400ml for optimum emptying

Pelvic floor muscle exercises

- Strong contraction to gain elevation of testicles & movement of penis into body
- Sitting Standing Lying
  3 strong holds of 10 seconds twice a day
- Slight lift whilst walking
- The knack
- Strong pelvic floor muscle contraction after voiding urine

Treatment for urge incontinence

- Patient education Model of male pelvis
- Lifestyle modifications
  Type and timing of fluids Diet
  Cranberry juice Not with warfarin Suvarna 2003
  Smoking Haidinger et al 2000
- Patient specific pelvic floor muscle exercise
- Urge suppression techniques
- Anticholinergics if severe

Urge Suppression techniques

- Keep calm
- Relax abdominal muscles
- Stand still or sit down
- Wait 1 minute until urge disappears
- NEVER RUSH TO TOILET MID-URGE
- Visit toilet or continue activities

RCT: Pelvic floor exercises for post-micturition dribble in men with erectile dysfunction

Dorey et al 2004

Pelvic floor exercises are significantly effective for post-micturition dribble ($p<0.002$)

Pre radical prostatectomy PFMEs

- RCT 16 men received PFMEs
  Sueppel et al 2001
- RCT 125 men had BFB & behavioral training
  Burgio et al 2006
- Both studies showed significant improvement

Post radical prostatectomy PFMEs

- RCT 102 men
  PFME group 95% continent at 4 months
  Van Kampen et al 2000
- RCT 300 men
  PFME group 19% continent at 1 month
  94.6% continent at 6 months
  Filocamo et al 2005

PFME after radical prostatectomy

Overgård et al 2008

- 42 PFE group & 43 controls received PFE info
- PFE group treated once a week until dry
- Dry at 1 year

92% in intervention group / 72% controls
(p=0.028)

PFME after TURP in MAPS trial

Glazener et al 2011

Men incontinent at 3 months:

- Stress incontinence 37% from 67%
- Urge incontinence 37% from 85%
- Post micturition 47% from 69%

PFME after Radical in MAPS trial

Glazener et al 2011

Men incontinent at 3 months:

- Stress incontinence 72% from 84%
- Urge incontinence 15% from 20%
- Post micturition 25% from 63%

Reasons why MAPS control group improved?

- All men in trial knew about PFMEs
- Some of control group had PFMEs as part of standard care
- Reflex contraction when leaking?
- Self-directed PFMEs?

Conditions treated by physical therapy

- Urge urinary incontinence ✓
- Stress urinary incontinence ✓
- Post micturition dribble ✓

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Physical therapy for urinary incontinence in the elderly

Jacqueline de Jong

Aetiology und Pathophysiology

The fast aging of populations around the world is presenting challenges for developed countries. These challenges can be counteracted by optimizing opportunities for health, participation and security in order to enhance quality of life as people age [28]. Active ageing allows people to realize their potential for physical, social and mental wellbeing (WHO). Urinary incontinence (UI) is one of the four giants (B. Isaacs1975) of geriatrics (memory loss, depression, falls/immobility and UI) and has a negative impact on quality of life in age.

The aetiology and pathophysiology of UI is a complex interaction between ageing alterations and lifestyle changes like social isolation, immobility and depression [28]. Studies describes a variety in prevalence of UI in a population between the age of 70- 75 [11,12,26,28]. The incidence of UI in a geriatric population is between 50 and 70%, increasing with age, decline of cognition, reduced mobility, neurologic diseases, and depressions. Other causal factors of LUTS are the often presently comorbidities, urinary tract infections, side effects of medicaments and urogynaecologic operations [9,10,11,31].

Due to the causal factors, we see a change in symptoms of LUTS in age. The onset of nocturnal polyuria, (wet) urgency and dysfunctional voiding are typical symptoms. Moreover, anorectal dysfunctions can influence the micturition. Incontinence is provoked by irreversible ageing processes of the urogenital tract; decrease of detrusor contractility, reduction of bladder compliance, degeneration of the urethral sphincter system (muscle layer⇩, urethral closure force ⇩, fibrosis of the connective tissue, vascularisation mucosa ⇩, nerve sliding velocity ⇩), und neuromuscular changes of the pelvic floor muscles (PFM) [26].
In our treatment we have to acknowledge the alterations that occur during ageing.

Assessment of UI in the frail older women

Age-related incontinence is rarely due to a single aetiology. The assessment must be adequate [3] but as minimally invasive as possible. Special consideration must be given to the level of cognition. Questions must be clear and adapted to the cognition level of the patient. Also sensitivity opposite the embarrassment of the aged patient is asked. Cognitive impairment is often combined with a decline of mobility and a higher risk for falls [18,32].

ICS outcome measures (ICS standardization committee 2005)

- Patient observation and symptoms
- Documentation of the symptoms
- Anatomical and functional Measures
- Quality of Life
- Socioeconomic measures

The standardized assessment of the pelvic floor [22] must be completed with an exam of the hip joints and the low back for testing general mobility. Different studies have proven the relation between balance and incontinence, therefore assessments to perceive level of stability and coordination must be included.

Functional health is a primary prevention for UI. Improvement of muscle strength, mobility, stability and coordination can improve LUTS [1,18,19]. But also retaining mental activity and sensibility for lifestyle and environmental changes are contributing factors.

Treatment options for LUTS in geriatrics
Treatment options for LUTS in geriatrics do not differ from interventions used in a general population, but the effectiveness of treatments in a geriatric population is poorly investigated.

The efficacy of PFMT is in different studies and Cochrane reviews demonstrated [6,15,16] but there is still a lack of evidence due to the heterogeneity of the study protocols. The evidence for improvement of UI in a geriatric population is difficult to prove because of the frequently existing comorbidities and therefore multiple treatments. Proven is the changing morphology of the PF after PFMT in an older population [2].
The application of **biofeedback** is a beneficial intervention because of the poor awareness of the PFM particularly in a geriatric population [29].

The efficacy of electro stimulation
Spruijt et al (2003) compared PFMT (home exercises) with electro-stimulation. No significant result was found. To remark is that the use of electro stimulation is more burdensome in a geriatric population and less cost effectiveness. Cochrane reviews [6,15,16] showed no significance outcome in a general female population.

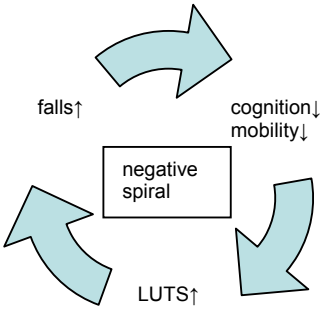
The efficacy of bladder training and behavioural therapy
Toilet regimes can contain timed voiding, habit training, prompted voiding and bladder training The choice of the training is dependent of cognition level, compliance and goal of the training (independing, depending or social continence). The efficacy of bladder training is underestimated and often is a drug applied. Pharmacological (antimuscarinic) side effects can be the negative influence cognition [32]. Cochrane reviews have proven die efficacy of bladder and behavioural training [9, 23, 24].

The efficacy of lifestyle changes
The importance of an optimal functional and mental health is proven [1,18,19]. Malnutrition plays a role in relationship to other geriatric symptoms [27]. Causal relationship between depressions, functional dependence, dementia and comorbidities and malnutrition exits [27,33]. Obesity has a correlation with a high prevalence of UI. The level of activity, balance and walking ability are reduced and often comorbidities like hypertension and diabetes mellitus occurs. This reduces the function of the PFM. Nutrition advices are also useful regarding the often age-related obstipation or stool incontinence because of changes in the anorectal tract, side effect of drug therapy or lack of exercise [13,30] (Fox 2005). Recommendations concerning fluid intake, bladder irritants (caffeine, alcohol juice) have to be given [13,23,30] Mobility restrictions can be the basis for not reach on time the toilet. Home environment changes like wearing practical cloths, use of tools and pads are meaningful and augment the quality of life [23].

Efficacy of whole body vibration training on SUI
Whole body vibration training (WBVT) might be a new method in the treatment of SUI. The effectiveness of WBVT is often studied for muscle performance and bone density. The efficacy von WBVT on UI is only poor investigated but showed in combination with PFMT positive results. One study measured the MVC, with and without WBV, of the PFM. The results showed a superposed augmentation of the MVC during WBV [20]. The working mechanism of WBV is based on activation of the muscle spindle. WBVT is a simple, feasible intervention and also patients with cognitive decline can absolve the training. A study of the Jong et al [5] compared the efficacy of WBVT alone with WBVT in combination with PFMT in a geriatric population suffering from SUI. The outcome showed in the WBVT group a small effect size, only the combination WBVT and PFMT was significant compared to the control group.

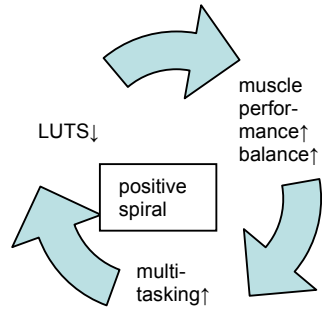
Relation between falls and UI and functional mobility

Different studies demonstrate the relation between falls and UI. Patients suffering from urgency, OAB, and especially nocturnal polyuria are more affected than patients suffering from SUI. Management of incontinence can be effective in the context of falls [4,12,17] .



An optimal functional health reduces the incidence of LUTS. Combined muscle strength- mobility- and gait training are more effective as muscle stretching with low intensive muscle strength training to gain functional mobility [18] A study of Jenkins et Fultz [18] found a high correlation between improvement of the functional mobility and reduction of urinary loss.

Kim et al [19] described the effects of multidimensional exercise on functional decline, UI and falls. The training consists of progressive strength training, balance, walking and PFM exercises.The results showed that the increased physical fitness contribute to improved functional decline and urinary incontinence symptoms. Dumoulin et al [7,8] studied the relationship between balance- lower extremity strength and the impact and/or severity of mixed UI in aging community-dwelling women. Outcome measures showed that women with UI performed less good the functional tests. In another study the association with impaired executive function and UI was investigated. The results suggest that executive control deficits, such as difficulties in disengaging attention from one task to the other or in coping with interference are strongly associated with UI.



Conclusions:

- the treatment of LUTS is mainly the same as in a general population
- the efficacy is of treatment is influenced by age-related comorbidities
- cognitive decline is a major factor to consider in the choice of the treatment
- different studies found a relationship between functional mobility and falls
- different studies found a relationship between functional mobility and UI
- improved muscle performance and balance can have a contribute benefit in the severity of LUTS
- A holistic multiple intervention program, considering age-related changes is recommend to decrease LUTS and to improve quality of life

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Several randomised controlled trials have demonstrated that PFM strength training in women with SUI is more effective than untreated controls or other treatment modalities, with varying cure rates between 44% and 67% (Miller *et al.*, 1998;Henalla *et al.*, 1988;Morkved *et al.*, 2002;Dumoulin *et al.*, 2004) . Yet although strength training is effective, strength of PFM contraction does not always correlate with continence state (Kessler & Constantinou, 1986;Theofrastous *et al.*, 2002;Morin *et al.*, 2004). It is unclear why rehabilitation is effective in some women and not in others as little research has focused upon the mechanisms of therapeutic change to help identify the critical components of training. Although there are exceptions, (Miller *et al.*, 2001;Dumoulin *et al.*, 2004;Miller *et al.*, 2008), most conservative treatment and assessment options remain focused upon strength training and they have rarely, if ever, considered other properties of PFM function, such as timing and direction of contraction, endurance, the ability of the PFM to relax, over-activity of the PFM, pelvic organ support and co-ordination with muscles of the abdominal-pelvic cylinder. Given the multi-purpose role of the PFM, the motor control challenge of the PFM will be immense and the efficiency of the PFMs would not only rely upon the anatomical integrity of the PF, but would depend on the central nervous system (CNS) response to satisfy hierarchical demands of function. The CNS must interpret the afferent input and generate a coordinated response so that the muscles' activity occurs at the right time, with the appropriate level of force.

The ability of the pelvic floor muscles (PFM) to generate strength may not be as important for continence function as was previously considered as many women with a strong PFM or greater PFM activity have stress urinary incontinence (SUI) and conversely a number of continent women have a weak pelvic floor. The latest Cochrane review concluded that after a PFM rehabilitation programme, although continence status improved, the strength of the PFM did not significantly improve and other aspects of PFM function that were not measured might contribute to the perception of improvement in incontinence (Dumoulin & Hay-Smith, 2008).

The pelvic floor forms the base of the abdominal cavity or lumbo-pelvic cylinder (LPC) and as such the PFM contract not only to maintain continence, but to augment intra-abdominal pressure (IAP) and spinal stability. Co-ordinated co-activation of the PFM is

therefore necessary in order to balance the functional demands of continence, respiration and lumbo-pelvic stability. It is known that a PFM contraction automatically occurs during rises of IAP, yet there is evidence that contraction of the PFM with other LPC muscles can be altered in women with UI. Furthermore, changes in posture and pain also affect motor recruitment of the muscles of the LPC. If the mechanisms of IAP generation and urethral closure pressure are affected in UI; posture and motor control deficits could be other contributing mechanisms by which the IAP exceeds urethral pressure, thereby facilitating leakage in UI.

From the point of view of resolving whether patients should undergo conservative treatment for urinary incontinence or surgical treatment, judicious evaluation of the PFM is necessary. It is a clinical and researched observation that there are a significant number of incontinent women who have a strong pelvic floor (Morin *et al.*, 2004;Theofrastous *et al.*, 2002) or greater pelvic floor muscle activity (Smith *et al.*, 2007) and conversely a number of continent women with a weak pelvic floor (Miller *et al.*, 1998). Practically, from the clinicians' point of view, effective management depends on a reliable, specific functional PFM assessment. When it is clear that the patient is able to generate a balanced PFM contraction, however weak, they can be assured that their neuromuscular circuitry is intact and the prospect of improvement is possible. However if they have a strong PFM contraction, strengthening would seem a futile exercise, and correct co-ordinated timing of contraction could be considered (Miller *et al.*, 1998;Dumoulin *et al.*, 2004;Devreese *et al.*, 2004;Smith *et al.*, 2007). According to ultrasound studies (Miller *et al.*, 2001) not all females with SUI are able to displace their urethra with a PFM contraction and clinical observations of the author, suggest that there are subtle differences in the direction of displacement of the urogenital structures of some females when asked to contract their PFM. It still is necessary to establish whether the ability to support the urethra with a PFM contraction; which would be a product of both neuro-muscular and appropriate connective restraints, is a good indicator of successful PFM rehabilitation. It would however explain why when some women contract their PFM there is not an increase in intra-urethral pressure even though the strength of PFM contraction is good. It is expected that further examination of these observation will ultimately lead to a better classification of PFM function and can be used to select patients for the most appropriate treatment. However, when patients do not

respond to conservative rehabilitation and are unable to accomplish a well timed, co-ordinated, balanced PFM contraction, the surgical option could be offered as it will minimize ineffective and futile physiotherapy.

Given that to date there is insufficient evidence for the use of LPC and posture training in addition to PFMT for women with UI, what is the clinician to do?

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