

Millenium, 2(26)




EFEITOS DA FISIOTERAPIA NA FUNÇÃO PÉLVICA E QUALIDADE DE VIDA EM MULHERES COM INCONTINÊNCIA URINÁRIA – UMA REVISÃO SISTEMÁTICA

EFFECTS OF PHYSIOTHERAPY ON PELVIC FUNCTION AND QUALITY OF LIFE IN WOMEN WITH URINARY INCONTINENCE – A SYSTEMATIC REVIEW

EFFECTOS DE LA FISIOTERAPIA EN LA FUNCIÓN PÉLVICA Y CALIDAD DE VIDA EN MUJERES CON INCONTINENCIA URINARIA - UNA REVISIÓN SISTEMÁTICA

Elisabete Matos¹  <https://orcid.org/0000-0002-1197-8579>

Telma Pires^{2,3}  <https://orcid.org/0000-0002-1937-9167>

Fátima Santos^{1,4,5}  <https://orcid.org/0000-0001-6816-2071>

Patrícia Pires^{6,7}  <https://orcid.org/0000-0003-1539-6936>

Sara Viana^{1,4}  <https://orcid.org/0000-0001-9610-248X>

Rui Viana^{1,4}  <https://orcid.org/0000-0002-2542-8068>

¹ Universidade Fernando Pessoa, Porto, Portugal

² Instituto Politécnico de Bragança, Bragança, Portugal

³ Research Centre for Active Living and Wellbeing (LiveWell), Bragança, Portugal

⁴ FP-I3ID - Instituto de Investigação, Inovação e Desenvolvimento da Universidade Fernando Pessoa, Porto, Portugal

⁵ RISE-Health, Porto, Portugal

⁶ Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal

⁷ CACTMAD-Centro Académico Clínico de Trás-os-Montes e Alto Douro, Vila Real, Portugal

Elisabete Matos – 8658@ufp.edu.pt | Telma Pires - telmapires@ipb.pt | Fátima Santos - fatimas@ufp.edu.pt | Patricia Pires - patriciampires@utad.pt | Sara Viana - sviana@ufp.edu.pt | Rui Viana - ruiav@ufp.edu.pt



Corresponding Author:

Elisabete Matos

Rua Delfim Maia, 334
4200-253 –Porto - Portugal
8658@ufp.edu.pt

RECEIVED: 30th May, 2024

REVIEWED: 15th September, 2024

ACCEPTED: 12th November, 2024

PUBLISHED: 03rd January, 2025

DOI: <https://doi.org/10.29352/mill0226.36183>

RESUMO

Introdução: Nos últimos anos, a fisioterapia do pavimento pélvico (PP), nomeadamente, o treino dos músculos do PP (TMPP) tem revelado uma elevada importância em mulheres com incontinência urinária (IU), na otimização da função pélvica e qualidade de vida (QdV).

Objetivo: Avaliar os efeitos da fisioterapia do PP na função pélvica e QdV em mulheres com IU.

Métodos: Pesquisa computadorizada nas bases de dados Pubmed, Scopus e Web of Science, recorrendo à combinação de palavras-chave: Fisioterapia; Incontinência urinária; QdV, de acordo com as guidelines PRISMA. A qualidade metodológica foi analisada através da escala de Physiotherapy Evidence Database (PEDro).

Resultados: Foram incluídos 19 artigos que cumpriram os critérios de elegibilidade com um total de 2253 participantes e com média aritmética de 8,4/10 na escala de PEDro. As intervenções do TMPP apresentaram efeitos positivos, ao nível de QdV, assim como na diminuição da perda involuntária de urina e aumento da força dos músculos do PP. Adicionalmente, o TMPP conciliado com o biofeedback, a eletroterapia ou o treino de Pilates, parece revelar efeitos significativos.

Conclusão: O TMPP é um tratamento eficaz para a IU em mulheres. O TMPP melhora significativamente a QdV de mulheres com IU, fator determinante para o estado físico, mental e social.

Palavras-chave: fisioterapia pélvica; incontinência urinária; qualidade de vida; treino dos músculos do pavimento pélvico

ABSTRACT

Introduction: In recent years, pelvic floor physiotherapy, namely pelvic floor muscle training (PFMT) has shown a high importance in women with urinary incontinence (UI), optimizing pelvic function and quality of life (QoL).

Objective: Evaluate the effects of pelvic floor physiotherapy on pelvic function and QoL in women with UI.

Methods: Computerized search in the databases Pubmed, Scopus, and Web of Science, using the combination of keywords: Physiotherapy; Urinary Incontinence; QoL, in accordance with PRISMA guidelines. The methodological quality was analysed using the Physiotherapy Evidence Database (PEDro) scale.

Results: Nineteen articles meeting the eligibility criteria were included with a total of 2253 participants and an arithmetic mean of 8.4/10 on the PEDro scale. PFMT interventions showed positive effects on QoL, as well as in decreasing involuntary urine loss and increasing pelvic floor muscle strength. In addition, PFMT combined with biofeedback, electrotherapy or Pilates training seemed to reveal significant effects.

Conclusions: PFMT is an effective treatment for UI in women. PFMT significantly improves QoL in women with UI, a determinant factor for physical, mental, and social conditions.

Keywords: pelvic floor muscle training; pelvic physiotherapy; quality of life; urinary incontinence

RESUMEN

Introducción: En los últimos años, la fisioterapia del suelo pélvico (SP), en particular, el entrenamiento de los músculos del SP (EMSP), ha demostrado tener una gran importancia en mujeres con incontinencia urinaria (IU), en la optimización de la función pélvica y calidad de vida (CdV).

Objetivos: Evalúe los efectos de la fisioterapia del SP en la función pélvica y CdV en mujeres con IU.

Métodos: Búsqueda computarizada en las bases de datos Pubmed, Scopus y Web of Science, utilizando la combinación de palabras clave: Fisioterapia; Incontinencia urinaria; CdV, de acuerdo con las directrices PRISMA. La calidad metodológica fue analizada mediante la escala de Physiotherapy Evidence Database (PEDro).

Resultados: Se incluyeron 19 artículos que cumplieron con los criterios de elegibilidad, con un total de 2253 participantes y una media aritmética de 8,4/10 en la escala de PEDro. Las intervenciones de EMSP mostraron efectos positivos, tanto en CdV como en la reducción de la pérdida involuntaria de orina y el aumento de la fuerza de los músculos del SP. Además, el EMSP combinado con biofeedback, electroterapia o entrenamiento de Pilates parece tener efectos significativos.

Conclusiones: El EMSP es un tratamiento eficaz para la IU en mujeres. Mejora significativamente la CdV de mujeres con IU, un factor determinante para el estado físico, mental y social.

Palabras clave: fisioterapia pélvica; incontinencia urinaria; calidad de vida; entrenamiento de los músculos del suelo pélvico

DOI: <https://doi.org/10.29352/mill0226.36183>

INTRODUCTION

Urinary incontinence (UI) is defined by the International Urogynecological Association (IUGA) as the involuntary loss of urine, predominantly in women, and its prevalence increases with age, being the most common pelvic floor (PF) dysfunction (Haylen et al., 2010). The global prevalence of UI ranges from 5% to 69% throughout a woman's lifetime (Abrams et al., 2009), leading to social and emotional discomfort for women with UI (Viana et al., 2014), thus impacting the quality of life (QoL) (Viana et al., 2015; Da Roza et al., 2013). Only 25% to 61% of women with UI seek treatment. Shame, lack of knowledge about treatment options, or fear of surgery may explain this reluctance to seek help (Portuguese Society of Gynaecology, 2018).

Risk factors for UI can be intrinsic (race, genetic predisposition, anatomical or neurological alterations), gynaecological or obstetric (pregnancy, type of delivery, multiparity, post-pelvic surgery, and radiotherapy, pelvic organ prolapse), or other factors (age, comorbidities, obesity, constipation, smoking, occupational activities, urinary infections, menopause, and medication) (Pires et al., 2021; Frawley et al., 2021; Pires et al., 2020a).

According to its aetiology and pathophysiology, UI can be classified into three types with different symptoms: Stress Urinary Incontinence (SUI) (involuntary loss of urine with physical exertion, such as coughing, sneezing, or sports activities), the most common type (33% to 50%); Urgency Urinary Incontinence (UUI) (involuntary loss of urine associated with an urgent need to urinate that is difficult to control); and Mixed Urinary Incontinence (MUI) (involuntary loss of urine associated with both urgency and increased intra-abdominal pressure) (Hagovska et al., 2017; Portuguese Society of Gynaecology, 2018; Whooley et al., 2020). UI poses a risk to QoL and often leads patients to anxiety, depression, and social isolation (Pierce et al., 2017), as well as physical inactivity, affecting health-related QoL (Da Roza et al., 2012).

Pelvic floor muscle training (PFMT) has been reported as effective in curing or improving UI symptoms in young, middle-aged, and older women with SUI or MUI, as well as in pregnant or postpartum women (Pires et al., 2020b; Dumoulin et al., 2017; Pires et al., 2020c). Clinical practice guidelines recommend individual and supervised PFMT as the first-line treatment for women with UI (Dumoulin et al., 2017; Pires et al., 2020d).

The aim of this study is to assess the effects of PF physiotherapy on pelvic function and QoL in women with UI, summarising and synthesizing the scientific evidence.

1. METHODS

The systematic review was registered according to the PROSPERO protocol (CRD42023488377) and was conducted in accordance with PRISMA guidelines (Page et al., 2021). The research was carried out in the following databases: PubMed, Scopus, and Web of Science, between January and April 2022. The keywords used were Physiotherapy, UI, and QoL, combined with Boolean operators (AND; OR). The search strategy (TS) used was: TS=(Physiotherapy* OR Pelvic floor muscle training) AND TS=(Urinary incontinence) AND TS=(Quality of Life) AND TS=(Randomized controlled trial OR RCT) AND TS=(Women OR Female), with filters for humans only, articles written in English and Spanish, from the last 5 years. The search was conducted by two independent researchers (EM, RV), who compared both results to check for overlap. Any discrepancies were discussed until a consensus was reached.

After the initial identification, duplicate articles were removed, and all titles and abstracts from the selected databases were screened. Then, potentially relevant studies were selected and retrieved, and the full texts were read to apply eligibility criteria according to the following inclusion criteria: women with UI; over 18 years old; community residents; receiving pelvic floor physiotherapy or under the supervision of a physiotherapist; randomized controlled trials (RCTs). The exclusion criteria were as follows: previous pelvic surgeries; pelvic organ prolapse (POP); pregnant women; on medication for UI; case studies; reviews and meta-analyses. Methodological quality was assessed using the PEDro scale, reported as a valid and reliable tool for measuring the methodological quality of RCTs. These parameters were independently evaluated by two authors (EM and RV), and all discrepancies were resolved.

2. RESULTS

The flowchart of the research conducted is presented below (Figure 1). The characteristics of this study are shown in Table 1. After going through all these stages, 19 RCTs were selected for analysis. The sample size ranged from 31 to 600 women with UI, with participants aged between 20-35, 48-58, and 60-70 years. The most reported type of UI was SUI, with 11 studies (1, 2, 3, 4, 8, 10, 11, 13, 15, 16, 19), 3 studies focused on MUI (5, 6, 9), 2 assessed UI and sexual dysfunction (11, 12), 1 assessed UUI (6), and 5 assessed UI without specifying the subtype, with 1 (18) also evaluating fecal incontinence (FI) in addition to UI. The follow-up duration of the studies ranged from 4 weeks (4) to 36 months (12). There were various approaches, but no uniform standard for PFMT was identified.

DOI: <https://doi.org/10.29352/mill0226.36183>

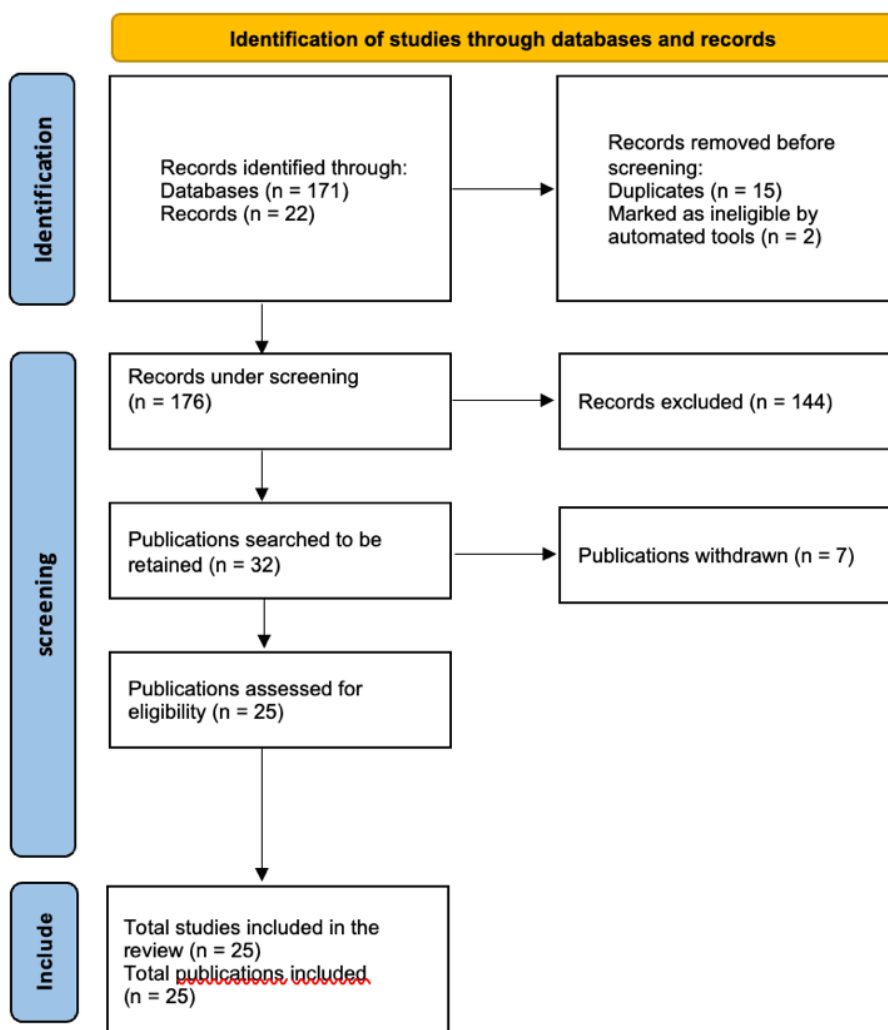


Figure 1 - PRISMA 2020 flow diagram for new systematic reviews that include database searches.

The mean methodological quality score of the included studies was 8.42 ± 1.73 (range 5-10) out of 10 points according to the PEDro scale. The most common methodological limitation among the studies was the lack of “blinded therapists,” which was nevertheless conducted by 10 studies (1, 3, 5, 6, 7, 9, 12, 15, 18, 19). The lack of “blinded assessors” was also a methodological limitation in 8 studies (2, 4, 8, 10, 11, 14, 16, 17) (Table 2).

To assess the parameters of muscle function, the following measurement instruments were used: perineometer (3, 11, 15, 16), dynamometer (6), and manometry (5, 13, 18), digital palpation using the Oxford Scale (3, 6, 13), digital palpation PERFECT (8, 15), Ortiz Scale (15), and transperineal ultrasound (6). To assess involuntary urine loss, the Pad test (5, 6, 7, 8) and a voiding diary (1, 6, 8, 13, 15) were used.

The measurement instruments used to assess sexual function were: FSFI (11) and ICIQ-FLUT SEX (6, 11). For the evaluation of UI symptoms and QoL: ICIQ – LUTSqol (6, 10, 17); ICIQ-UI SF (3, 5, 6, 10, 14, 15); PGI -I – Patients Impression of Improvement for Incontinence – (5); Australian Pelvic Floor Questionnaire (APFQ) (18); Incontinence Severity Index - ISI - (1); King’s Health Questionnaire (1, 15, 16); PISQ – 31 - Prolapse and Incontinence Sexual Function Questionnaire (12); SF-36 (12); EQ – ID (12); EQ – 5 D (12); E-PAQ (12); QoL short form - (7, 8, 14, 16); ICIQ-N (6); ICIQ – VS (6); Rosenberg Self-Esteem Scale (14); Geriatric Self Efficacy Scale (6); and Broom Self-Efficacy (6).

Different types of technology associated with PFMT were used: virtual reality (game therapy) (5); NeoControl chair (extracorporeal magnetic innervation) (19); 1 study that used an Easy K7 device that transmits low-frequency stimulation (11); and 2 studies that employed a mobile application (Tät) for the home self-management of PFMT (2, 10).

DOI: <https://doi.org/10.29352/mill0226.36183>

Table 1 - Characteristics of the included studies

References	Demographic characterization	Aims of the studies	Duration/ Follow-up	Intervention protocol	Treatment duration	Quantified parameters	Results
1. Abreu et al 2017	n = 33 Women ≥18 Years	Comparing the results of training with the lumbopelvic technique or PFMT in women with SUI	90 days	Lumbopelvic technique + PFMT	Sessions twice a week (T:5 weeks)	UI severity, QoL and feeling of improvement	The PFMT was superior to the lumbopelvic technique in terms of the number of episodes of loss, QoL and feeling of improvement after 90 days evaluation ($p < 0.001$), showing a more prolonged effect.
2. Asklund et al 2017	n = 123 Women ≥18 Years (±45)	Evaluate the effect of PFMT using a mobile application (app) to treat SUI	6 weeks	PFMT + app	Twice a month	Urinary symptoms and QoL	App-based treatment was effective for women with SUI with clinically relevant QoL improvements ($p < 0.001$). Recommended as first-line treatment.
3. Belushi et al 2020	n = 145 Women ≥18 Years	To determine the effectiveness of PFMT (home) in reducing symptom severity and improving QoL among SUI women	12 weeks	PFMT at home	5 sessions per day (T:12 weeks)	PMF strength evaluation by palpation and perineometer, ICIQ-SF	PFMT at home is an effective treatment in reducing the severity of symptoms and improving QoL in women with SUI ($p < 0.001$).
4. Bertotto et al 2017	n = 31 Women ≥18 Years (±58)	Comparing the effectiveness of PFMT with and without BFB in increasing MS, improving electromyographic activity and improving pre-contraction and QoL in postmenopausal women with SUI.	4 weeks	BFB + PFMT	2 sessions per week (T: 8 sessions)	ICIQ	PFMT, with and without BFB, is associated with increased FM, electromyographic activity, PFM pre-contraction and improved QoL in postmenopausal women with SUI ($p < 0.0001$).
5. Bezerra et al 2020	n = 32 Women ≥45 - ≤ 70 Years	Evaluating PFMT + GT in improving PFM strength, urinary loss and perceived improvement in women with MUI	8 weeks	PFMT vs PFMT + GT	Twice a week (T: 8 weeks)	PFM strength evaluation by manometry, ICIQ-SF, urinary symptoms	There were no significant differences between the groups. Both treatments were effective for MUI symptoms. Increase in perceived improvement according to women's feedback/description.
6. Dumoulin et al 2017	n = 364 Women ≥60 Years	Determining whether PFMT in women > /+60 years + UUI or MUI is not significantly less effective, sustainable and affordable than individual PFMT	12 months	PFMT in group vs individual	Weekly sessions (T: 12 weeks)	Adherence, urinary symptoms, severity and treatment of SUI, muscle function, QoL in both moments	A group-based approach is no less effective than individual PFMT ($p < 0.05$) and is more economical. Better perceived improvement in symptoms and QoL.
7. Dumoulin et al 2020	n = 362 Women ≥60 Years	Evaluate the effectiveness of group PFMT compared to individual PFMT on UI in elderly women	12 months	PFMT in group vs individual	Weekly sessions (T: 12 weeks)	Urinary symptoms, severity and treatment, resolution of UI, muscle function, QoL in the 3 moments	A group-based approach is no less effective than individual PFMT in SUI and MUI ($p < 0.05$).

DOI: <https://doi.org/10.29352/mill0226.36183>

References	Demographic characterization	Aims of the studies	Duration/ Follow-up	Intervention protocol	Treatment duration	Quantified parameters	Results
8. Fitz et al 2017	n = 72 Women ≥18 Years	Evaluate whether BFB + PFMT increases exercise frequency in women with SUI	9 months	BFB + PFMT	3 months	Adherence, urinary symptoms, severity and treatment of SUI, muscle function, QoL in both moments	Both treatments improved muscle function and QoL similarly (p < 0.005).
9. Hagen et al 2020	n = 600 Women ≥ 18 Years (±48)	To evaluate the efficacy of PFMT + BFB or PFMT alone for stress or mixed urinary incontinence in women	6, 12, 24 months	BFB + PFMT	6 sessions (T: 16 weeks)	Self-reported severity of UI; Women's perception of improved QoL	No significant differences in UI severity between groups of PFMT + BFB and PFMT alone. Frequent use of BFB with PFMT should not be recommended.
10. Hoffman et al 2017	n = 123 Women ≥27 Years	Evaluate long-term effects of using app with PFMT for SUI	24 months	PFMT with app	3 months	ICIQ-LUTSqol, ICIQ-SF	Self-management of SUI with an app had significant (p < 0.001) and clinically relevant long-term results - recommended as first-line treatment.
11. Hwang et al 2019	n = 342 Women ≥18 Years	To evaluate the effects of TES (EasyK7) + PFMT to improve the parameters (strength, power and endurance) of PFM and sexual function and to identify the correlation between the increase in PFM parameters and sexual function after 8 weeks of training using TES in women with SUI.	8 weeks	TES in a sitting position	5 to 6 days per week (T: 8 weeks)	PFM parameters and sexual function (perineometer and FSFI)	TES in a sitting position showed a beneficial effect on sexual function in women with SUI (p = 0.006), and consequently on QoL.
12. Jha et al 2017	n = 114 Women ≥18 Years	To clinically evaluate the cost-effectiveness of electrical stimulation + PFMT compared to PFMT alone in women with UI and sexual dysfunction	36 months	Electrical stimulation + PFMT	30 sessions, with 4 to 6 weeks apart	PISQ-31	In women with UI + sexual dysfunction, PFMT is beneficial in improving overall sexual function (p < 0.05). However, no training is beneficial over another.
13. Jose-Vaz et al 2020	n = 130 Women ≥18 Years	Check the best technique to improve SUI symptoms: abdominal-hypo technique or PFMT	12 weeks	PFMT vs abdominal-hypo technique	2 sessions per week (T: 12 weeks)	QoL, ICIQ-SF, FM strength evaluation by MOS	With regard to SUI symptoms, impact on QoL and PFM function, both groups showed improvement, but PFMT was superior to abd-hypo among all of them (p < 0.05).
14. Lausen et al 2018	n = 73 Women ≥18 Years	To provide preliminary information on the efficacy of modified Pilates as an adjunct to PFMT for UI and to test the feasibility of an RCT project	5 months	Modified Pilates training program and PFMT	6 sessions per week	Self-reported UI, QoL and self-esteem, qualitative interviews	Modified Pilates classes can positively influence attitudes towards exercise, diet and well-being (p < 0.05). A definitive RCT is feasible but will require a large sample size for clinical practice purposes.

DOI: <https://doi.org/10.29352/mill0226.36183>

References	Demographic characterization	Aims of the studies	Duration/ Follow-up	Intervention protocol	Treatment duration	Quantified parameters	Results
15. Marques et al 2019	n = 40 Women ≥18 Years	To evaluate the effectiveness of PFMT + training of the gluteus maximus, gluteus medius and hip adductor versus PFMT alone in the treatment of SUI	10 weeks	TMPP + training to strengthen the hip muscles	20 sessions per week (T:10 weeks)	Frequency of urine loss; PFM muscle strength, Ortiz and Oxford; QoL at both moments (KHQ and ICIQ-SF)	The hip muscle strengthening training group showed a significant decrease in the frequency of daily losses ($p < 0.001$), with no significant differences between the groups for QoL or PFM evaluation.
16. Orhan et al 2018	n = 48 Women ≥18 Years	To assess whether VTT + PFMT is more effective than PFMT alone for the treatment of SUI	12 weeks	VTT + PFMT vs PFMT alone	5 days per week (T:12 weeks)	Urinary symptoms, muscle function, QoL	PFMT with and without VTT exercises with similar efficacy on SUI symptoms and QoL.
17. Ptak et al 2019	n = 137 Women ≥18 Years (±53)	To assess the impact of PFMT alone and combined PFMT + Trans-abd training on the QoL of patients with UI, in relation to the number of vaginal deliveries.	12 weeks	PFMT + TrA	4 sessions per week (T: 12 weeks)	QoL and ICIQ-LUTSqol	Both PFMT + TrA and PFMT alone improve the QoL of women with UI ($p < 0.05$). However, PFMT + TrA is more effective. PFMT + TrA better results in multiparous women than PFMT alone ($p < 0.001$).
18. Sigurdardottir et al 2019	n = 84 Women ≥18 Years	Evaluate the effects of PFMT in the immediate postpartum period on UI and FI and associated after-effects, as well as PFM strength and endurance	12 months	BFB + PFMT	12 sessions per week	Muscle function, urinary symptoms	Significant improvements in postpartum UI with PFMT ($p = 0.03$), as well as the perception of discomfort ($p = 0.005$).
19. Weber-Rajek et al 2020	n = 128 Women ≥18 Years	To evaluate the efficacy of PFMT and extracorporeal magnetic innervation (NeoControl) in the treatment of UI in women with SUI.	12 weeks	ExMI (NeoControl) vs PFMT	3 sessions per week (T: 4 weeks)	KHQ	PFMT + ExMI proved to be an effective method for SUI in women. Improvement in physical and psychosocial aspects (no statistical significance).

BFB – Biofeedback; ExMI - extracorporeal magnetic innervation; GT – Game Therapy; ICIQ-LUTSqol - Incontinence Questionnaire Lower Urinary Tract Symptoms Quality of Life Module; ICIQ-SF - International Consultation on Incontinence Questionnaire—Short Form; KHQ - King’s Health Questionnaire; MOS - Modified Oxford grading System; MS – Muscle Strength; MUI – Mixed Urinary Incontinence; PF – Pelvic Floor; PFM – Pelvic Floor Muscles; PFMT – Pelvic Floor Muscle Training; PISQ – 31 - Prolapse and Incontinence Sexual Function Questionnaire; QoL – Quality of Life; RCT – Randomized Controlled Trial; SUI – Stress Urinary Incontinence; TES - Transcutaneous Electrical Stimulation; TrA – Training of Transversus Abdominus Muscle; UI – Urinary Incontinence; UUI – Urge Urinary Incontinence; VTT – Vaginal Tampon Training.

DOI: <https://doi.org/10.29352/mill0226.36183>

Table 2 - Methodological quality of the analysed studies

References	Study design	PEDro											Conflict of interests	Score	
		E	2	3	4	5	6	7	8	9	10	11			
1. Abreu et al 2017	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
2. Asklund et al 2017	RCT Parallel group	+	+	-	+	-	NA	NA	+	-	+	+	+	no	5
3. Belushi et al 2020	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
4. Bertotto et al 2017	RCT Parallel group	+	+	+	+	+	-	-	+	+	+	+	+	no	8
5. Bezerra et al 2020	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
6. Dumoulin et al 2017	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	NA	no	9
7. Dumoulin et al 2020	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
8. Fitz et al 2017	RCT Parallel group	+	+	-	+	-	-	-	+	+	+	+	+	no	6
9. Hagen et al 2020	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
10. Hoffman et al 2017	RCT Parallel group	+	+	+	+	-	NA	NA	+	-	+	+	+	no	6
11. Hwang et al 2019	RCT Parallel group	+	+	+	+	+	NA	NA	+	+	+	+	+	no	8
12. Jha et al 2017	RCT Parallel group	+	+	+	+	+	+	+	NA	+	+	+	+	no	9
13. Jose-Vaz et al 2020	RCT Parallel group	+	+	+	+	+	-	-	+	+	+	+	+	no	9
14. Lausen et al 2018	RCT Parallel group	+	+	+	+	+	-	-	+	+	+	+	+	no	8
15. Marques et al 2019	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
16. Orhan et al 2018	RCT Parallel group	+	+	+	+	+	-	-	+	+	+	+	+	no	6
17. Ptak et al 2019	RCT Parallel group	+	+	-	+	-	-	-	+	+	+	+	+	no	6
18. Sigurdardottir et al 2019	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10
19. Weber-Rajek et al 2020	RCT Parallel group	+	+	+	+	+	+	+	+	+	+	+	+	no	10

RCT - Randomized Controlled Trials; Eligibility criteria (this item does not count towards the final score); 2. Random allocation; 3. Concealed allocation; 4. Comparability; 5. Participant blinding; 6. Therapist blinding; 7. Evaluator blinding; 8. <15% dropout; 9. Intention-to-treat analysis; 10. Statistical comparisons between groups; 11. Statistical measures of variability; NA - Not applicable

3. DISCUSSION

This systematic review provided a comprehensive description of pelvic rehabilitation methodologies in promoting QoL in women with UI and highlighted the results related to PFMT.

Despite the heterogeneity in the assessment measures used to evaluate urinary symptoms, all studies demonstrated a reduction in the amount of involuntary urine loss, a decrease in the frequency of UI, an improvement in QoL in the PFMT groups following the intervention, and a significant increase in pelvic floor muscle (PFM) strength in the intervention groups before and after PFMT.

Sigurdardottir et al. (2019) evaluated PFMT in the postpartum period and concluded that PFMT reduces the rate of UI and discomfort present in the postpartum phase. The strength and endurance of the PFM also increased regardless of whether they were performed individually or in groups; this improvement appears to be related to the physical contact with the physiotherapist. Teaching and assessing the contractility of the PFM were included to ensure correct performance, resulting in improved body awareness, structural support of the pelvic organs, and the ability to perform quicker automatic contractions of the PFM.

The study by Hwang et al. (2019) evaluated potential improvements from an 8-week program of transcutaneous electrical stimulation (TES) on the strength parameters of the pelvic floor and sexual function in women with UI. The outcome was an increase in PFM strength and also in the domain of sexual function improvement attributed to enhanced stimulation of the PFMs. The increased contractions of the PFMs and blood flow necessary during sexual activity, along with a decrease in fear of dyspareunia and urinary loss during intercourse, enable women to regain desire, arousal, and sexual satisfaction.

Jha et al. (2017) also included in their protocol PFMT combined with electrical stimulation over 36 months, but no statistically significant differences were found compared to the group that performed isolated PFMT.

In the training programs by Dumoulin et al. (2020), individual versus group PFMT showed similar efficacy for all evaluated criteria (muscle function, UI treatment, and QoL), except for sexual issues associated with lower urinary tract symptoms. For these authors, the group approach allows for a rapid increase in the number of women treated with PFMT and makes access easier. Similarly, Dumoulin et al. (2017) noted that the impact of group PFMT is positive compared to individual PFMT sessions regarding the accessibility of continence care for women, being equally effective and more economical.

Other studies that combined biofeedback (BFB) with PFMT (Bertotto et al., 2017; Fitz et al., 2017; Hagen et al., 2020) concluded that after 24 months, comparing women who underwent BFB in a clinical context and PFMT at home with those who only performed PFMT, improvements in UI were observed in both groups, indicating that supervised and protocolized PFMT with or without BFB provides benefits.

Improvements in muscle strength and EMG activity were reported in the PFMT group with BFB, particularly in pre-contraction, endurance, and maximum voluntary contraction (MVC) in postmenopausal women. According to this study, adding BFB to PFMT helps women control and become aware of their activities and muscle activation, thus managing potential losses during daily life activities (Bertotto et al., 2017).

The literature shows that groups treated with BFB have greater progress in treating UI, likely due to the instruction on contraction in women assessed with low awareness of pelvic floor musculature (Castro et al., 2010) and that BFB-assisted PFMT is more effective than

DOI: <https://doi.org/10.29352/mill0226.36183>

isolated PFMT in improving clinical symptoms, uroflowmetry parameters, and electromyographic activity during urination (EMG) (Sam et al., 2022).

In studies evaluating the effect of PFMT alongside vaginal tampon use compared to isolated PFMT, training effectiveness yielded similar results between the two training types regarding PFM strength and endurance, UI, and QoL. The progression was more rapid in the PFMT group with the use of a vaginal tampon. The innovation of the study was the use of a vaginal tampon in PFMT instead of vaginal cones, where the training involved pulling the tampon, thus rendering the weight of the vaginal cone ineffective (Orhan et al., 2018).

Results from game therapy showed improvement in symptoms of urge incontinence, however, associating a game-form therapy with PFMT did not demonstrate better results than isolated PFMT (Bezerra et al., 2020).

To compare the effects of PFMT with the abdomen-hypopressive technique in reducing urinary loss in women with UI, a reduction in symptoms was observed both in women who performed PFMT with the abdomen-hypopressive technique and those who only performed PFMT.

PFMT was superior to the abdomen-hypopressive technique in muscular parameters, symptom reduction of SUI, and QoL improvement. However, the reduction was significantly greater in women undergoing PFMT (Jose-Vaz et al., 2020). Other studies also corroborate better results from PFMT (Dumoulin et al., 2017) due to the fact that the abdomen-hypopressive technique does not directly activate the contraction of the PFMs.

Studies evaluated the impact of isolated PFMT versus PFMT combined with transverse abdominal muscle (trA) activation on QoL in women with UI concerning the number of childbirths, showing that PFMT was similar for both groups. Both training types yielded positive results; however, synergistic training of the PFMs with the trA muscle was more effective in muscle parameters and QoL (Ptak et al., 2019). Other authors reported that simultaneous contraction of the trA and PFMs promotes continence (Junginger et al., 2010).

For the efficacy of dynamic lumbar-pelvic stabilization exercises in treating women with UI, compared to isolated PFMT, a similar PFMT program was implemented in both groups, and the authors concluded that there were no statistical differences in the severity of losses between the two groups. However, 90 days post-intervention, the experimental group showed a reduction in the frequency of losses and an improvement in QoL (Abreu et al., 2017).

In another study, the authors investigated the effect of strengthening exercises for the PFMs and hip muscles (adductors and abductors, gluteus maximus, and medius) compared to the isolated strengthening of the PFMs in treating SUI. According to the results, there were no significant differences between the two groups regarding functional assessment of the PFMs, perineometry, and voiding diary, as well as QoL. Thus, hip exercise training did not translate to greater strengthening of the PFM. However, the important factor of this training was the increased synergy of the pelvic muscles due to the anatomical relationship of the hip muscles with the PFMs, thus contributing to the continence mechanism and greater efficacy of physiotherapy in treating UI (Marques et al., 2019).

In the same line of training, authors like Lausen et al. (2018) associated the positive effects of modified Pilates training with PFMT in treating UI. These benefits may have arisen from participation in classes that positively influenced attitudes toward exercise, diet, and well-being. In women with mild urinary loss symptoms, the advantage of performing modified Pilates training lies in improving self-esteem, reducing social embarrassment, lowering the impact on daily living activities, and improving personal relationships.

Participation in PFMT is supported by the Cochrane review, which supports the current grade A recommendation for PFMT as a first-line treatment for women with UI (Cacciari et al., 2019).

Regarding studies with long-term follow-up, Asklund et al. (2017) and Hoffman et al. (2017) evaluated the effects of a PFMT program using a mobile application in women with SUI, yielding significant and clinically relevant results that could serve as a first-line treatment for women with UI concerning long-term follow-up (Hoffman et al., 2017).

In terms of QoL, studies have shown improvements when women are integrated into PF physiotherapy programs either individually or in groups; however, women participating in group PFMT report a better perception of improvement in urinary symptoms and QoL (Abreu et al., 2017; Dumoulin et al., 2020; Dumoulin et al., 2017; Lausen et al., 2018).

Similar results were obtained regarding improvements in QoL in treating UI in both the group receiving extracorporeal magnetic innervation (ExMI) and the group receiving PFMT, both in terms of the severity of UI and emotions, as well as social limitations. However, PFMT as a treatment for UI has fewer contraindications than therapy by ExMI (Weber-Rajek et al., 2020).

LIMITATIONS

The variety and array of interventions, including techniques, procedures, and protocols in PF physiotherapy, as well as potentially smaller sample sizes, may not provide conclusive data regarding the most effective intervention. It is also worth mentioning the subjectivity of certain assessment instruments that may have influenced the study outcomes.

CONCLUSION

After conducting this study, it can be concluded that PF physiotherapy intervention, utilizing PFMT in women with UI, should be considered an effective treatment, demonstrating promising results in increasing PFM strength, reducing involuntary urine loss, and improving QoL.

DOI: <https://doi.org/10.29352/mill0226.36183>

AUTHOR CONTRIBUTIONS

Conceptualization, E.M., T.P. and R.V.; data curation, E.M.; formal analysis, T.P. and P.P.; funding acquisition, E.M.; investigation, E.M., T.P. and P.P.; methodology, E.M., F.S., P.P. and R.V.; project administration, E.M. and R.V.; resources, E.M. and T.P.; software, E.M.; supervision, E.M., T.P., P.P. and R.V.; validation, E.M., T.P. and R.V.; visualization, E.M., T.P., F.S., P.P. and S.V.; writing-original draft, E.M. and T.P.; writing-review and editing, E.M., T.P., F.S., P.P., S.V. and R.V.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Abrams, P., Cardozo, L., Khoury, S., & Wein, A. J. (2023). *Incontinence 7th Edition*, p.27. International Continence Society <https://www.ics.org/ici>
- Abreu, N. de S., de Castro Villas Boas, B., Netto, J. M. B., & Figueiredo, A. A. (2017). Dynamic lumbopelvic stabilization for treatment of stress urinary incontinence in women: Controlled and randomized clinical trial. *Neurourology and Urodynamics*, 36(8), 2160–2168. <https://doi.org/10.1002/nau.23261>
- Belushi, Z. I. Al, Al Kiyumi, M. H., Al-Mazrui, A. A., Jaju, S., Alrawahi, A. H., Al Mahrezi, A. M., Belushi, Z. I. Al, Kiyumi, M. H. Al, Al-Mazrui, A. A., Ahrezi, S. J., Alrawahi, A. H., Al, A. M., Al Belushi, Z. I., Al Kiyumi, M. H., Al-Mazrui, A. A., Jaju, S., Alrawahi, A. H., & Al Mahrezi, A. M. (2020). Effects of home-based pelvic floor muscle training on decreasing symptoms of stress urinary incontinence and improving the quality of life of urban adult Omani women: A randomized controlled single-blind study. *Neurourology and Urodynamics*, 39(5), 1557–1566. <https://doi.org/10.1002/nau.24404>.
- Bertotto, A., Schvartzman, R., Uchôa, S., & Wender, M. C. O. (2017). Effect of electromyographic biofeedback as an add-on to pelvic floor muscle exercises on neuromuscular outcomes and quality of life in postmenopausal women with stress urinary incontinence: A randomized controlled trial. *Neurourology and Urodynamics*, 36(8), 2142–2147. <https://doi.org/10.1002/nau.23258>
- Bezerra, L. O., De Oliveira, M. C. E., Da Silva Filho, E. M., Vicente Da Silva, H. K., Menezes De Oliveira, G. F., Da Silveira Gonçalves, A. K., Pegado, R., & Micussi, M. T. A. B. C. (2020). Impact of Pelvic Floor Muscle Training Isolated and Associated with Game Therapy on Mixed Urinary Incontinence: A Randomized Controlled Trial. *Games for Health Journal*, 10(1), 43–49. <https://doi.org/10.1089/g4h.2019.0207>
- Cacciari, L. P., Dumoulin, C., & Hay-Smith, E. J. (2019). Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women: a cochrane systematic review abridged republication. *Brazilian Journal of Physical Therapy*, 23(2), 93–107. <https://doi.org/10.1016/j.bjpt.2019.01.002>
- Castro, A. P. de, Pereira, V. S., Serrão, P. R. M. da S., & Driusso, P. (2010). Effectiveness of biofeedback for the treatment of stress urinary incontinence: a systematic review. *Scientia Medica (Porto Alegre)*, 20(16), 257–263.
- Da Roza, T., De Araujo, M. P., Viana, R., Viana, S., Jorge, R. N., Bø, K., & Mascarenhas, T. (2012). Pelvic floor muscle training to improve urinary incontinence in young, nulliparous sport students: A pilot study. *International Urogynecology Journal*, 23(8), 1069–1073. <https://doi.org/10.1007/s00192-012-1759-2>
- Da Roza, T., Mascarenhas, T., Araujo, M., Trindade, V., & Jorge, R. N. (2013). Oxford Grading Scale vs manometer for assessment of pelvic floor strength in nulliparous sports students. *Physiotherapy (United Kingdom)*, 99(3), 207–211. <https://doi.org/10.1016/j.physio.2012.05.014>
- De Morton, N. A. (2009). The PEDro scale is a valid measure of the methodological quality of clinical trials: a demographic study. *Australian Journal of Physiotherapy*, 55(2), 129–133. [https://doi.org/10.1016/S0004-9514\(09\)70043-1](https://doi.org/10.1016/S0004-9514(09)70043-1)
- Dumoulin, C., Morin, M., Danieli, C., Cacciari, L., Mayrand, M.-H., Tousignant, M., Abrahamowicz, M., & Urinary Incontinence and Aging Study Group. (2020). Group-Based vs Individual Pelvic Floor Muscle Training to Treat Urinary Incontinence in Older Women: A Randomized Clinical Trial. *JAMA Internal Medicine*, 180(10), 1284–1293. <https://doi.org/10.1001/jamainternmed.2020.2993>
- Dumoulin, C., Morin, M., Mayrand, M. H., Tousignant, M., & Abrahamowicz, M. (2017). Group physiotherapy compared to individual physiotherapy to treat urinary incontinence in aging women: Study protocol for a randomized controlled trial. *Trials*, 18(1), 1–14. <https://doi.org/10.1186/s13063-017-2261-4>
- Fitz, F. F., Stüpp, L., da Costa, T. F., Bortolini, M. A. T., Girão, M. J. B. C., & Castro, R. A. (2017). Outpatient biofeedback in addition to home pelvic floor muscle training for stress urinary incontinence: a randomized controlled trial. *Neurourology and Urodynamics*, 36(8), 2034–2043. <https://doi.org/10.1002/nau.23226>

DOI: <https://doi.org/10.29352/mill0226.36183>

- Frawley, H., Shelly, B., Morin, M., Bernard, S., Kari, B., Digesu, G. A., Dickinson, T., Goonewardene, S., McClurg, D., Rahnama'i, M. S., Schizas, A., Slieker-ten Hove, M., Takahashi, S., & Voelkl Guevara, J. (2021). An International Continence Society (ICS) report on the terminology for pelvic floor muscle assessment. *Neurourology and Urodynamics*, February. <https://doi.org/10.1002/nau.24658>
- Gibson, W., Hunter, K. F., Camicioli, R., Booth, J., Skelton, D. A., Dumoulin, C., Paul, L., & Wagg, A. (2018). The association between lower urinary tract symptoms and falls: Forming a theoretical model for a research agenda. *Neurourology and Urodynamics*, 37(1), 501–509. <https://doi.org/10.1002/nau.23295>
- Hagen, S., Elders, A., Stratton, S., Sergenson, N., Bugge, C., Dean, S., Hay-Smith, J., Kilonzo, M., Dimitrova, M., Abdel-Fattah, M., Agur, W., Booth, J., Glazener, C., Guerrero, K., McDonald, A., Norrie, J., Williams, L. R., & McClurg, D. (2020). Effectiveness of pelvic floor muscle training with and without electromyographic biofeedback for urinary incontinence in women: Multicentre randomised controlled trial. *The BMJ*, 371, 1–11. <https://doi.org/10.1136/bmj.m3719>
- Hagovska, M., Švihra, J., Buková, A., Hrobacz, A., Dračková, D., Švihrová, V., & Kraus, L. (2017). Prevalence of urinary incontinence in females performing high-impact exercises. *International Journal of Sports Medicine*, 38(3), 210–216. <https://doi.org/10.1055/s-0042-123045>
- Haylen, B. T., De Ridder, D., Freeman, R. M., Swift, S. E., Berghmans, B., Lee, J., Monga, A., Petri, E., Rizk, D. E., Sand, P. K., & Schaer, G. N. (2010). An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *International Urogynecology Journal*, 21(1), 5–26. <https://doi.org/10.1007/s00192-009-0976-9>
- Hoffman, V., Söderström, L., & Samuelsson, E. (2017). Self-management of stress urinary incontinence via a mobile app: Two-year follow-up of a randomized controlled trial. *Acta Obstetrica Et Gynecologica Scandinavica*, 96(10), 1180–1187. <https://doi.org/10.1111/aogs.13192>
- Hwang, U. jae, Lee, M. seok, Jung, S. hoon, Ahn, S. hee, & Kwon, O. yun. (2019). Pelvic Floor Muscle Parameters Affect Sexual Function After 8 Weeks of Transcutaneous Electrical Stimulation in Women with Stress Urinary Incontinence. *Sexual Medicine*, 7(4), 505–513. <https://doi.org/10.1016/j.esxm.2019.08.011>
- Jha, S., Walters, S. J., Bortolami, O., Dixon, S., & Alshreef, A. (2017). Impact of pelvic floor muscle training on sexual function of women with urinary incontinence and a comparison of electrical stimulation versus standard treatment (IPSU trial): a randomised controlled trial. *Physiotherapy (United Kingdom)*, 104(1), 91–97. <https://doi.org/10.1016/j.physio.2017.06.003>
- Jose-Vaz, L. A., Andrade, C. L., Cardoso, L. C., Bernardes, B. T., Pereira-Baldon, V. S., & Resende, A. P. M. (2020). Can abdominal hypopressive technique improve stress urinary incontinence? An assessor-blinded randomized controlled trial. *Neurourology and Urodynamics*, 39(8), 2314–2321. <https://doi.org/10.1002/nau.24489>
- Junginger, B., Baessler, K., Sapsford, R., & Hodges, P. W. (2010). Effect of abdominal and pelvic floor tasks on muscle activity, abdominal pressure and bladder neck. *International Urogynecology Journal*, 21(1), 69–77. <https://doi.org/10.1007/s00192-009-0981-z>
- Lausen, A., Marsland, L., Head, S., Jackson, J., & Lausen, B. (2018). Modified Pilates as an adjunct to standard physiotherapy care for urinary incontinence: A mixed methods pilot for a randomised controlled trial. *BMC Women's Health*, 18(1), 1–12. <https://doi.org/10.1186/s12905-017-0503-y>
- Marques, S. A. A., Silveira, S. R. B. d., Pássaro, A. C., Haddad, J. M., Baracat, E. C., & Ferreira, E. A. G. (2019). Effect of Pelvic Floor and Hip Muscle Strengthening in the Treatment of Stress Urinary Incontinence: A Randomized Clinical Trial. *Journal of Manipulative and Physiological Therapeutics*, 43(3), 247–256. <https://doi.org/10.1016/j.jmpt.2019.01.007>
- Orhan, C., Akbayrak, T., Özgül, S., Baran, E., Üzelpasaci, E., Nakip, G., Özgül, N., & Beksaç, M. S. (2018). Effects of vaginal tampon training added to pelvic floor muscle training in women with stress urinary incontinence: randomized controlled trial. *International Urogynecology Journal*, 30(2), 219–229. <https://doi.org/10.1007/s00192-018-3585-7>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Pierce, H., Perry, L., Gallagher, R., & Chiarelli, P. (2017). Urinary incontinence, work, and intention to leave current job: A cross sectional survey of the Australian nursing and midwifery workforce. *Neurourology and Urodynamics*, 36(7), 1876–1883. <https://doi.org/10.1002/nau.23202>

DOI: <https://doi.org/10.29352/mill0226.36183>

- Pires, T., Pires, P., Moreira, H., Gabriel, R., Reis, A., Viana, S., & Viana, R. (2021). Leg stiffness and muscle power vs manometer in sportswomen with symptoms of stress urinary incontinence. *Clinical Biomechanics*, 90(September). <https://doi.org/10.1016/j.clinbiomech.2021.105471>
- Pires, T., Pires, P., Moreira, H., Gabriel, R., Viana, S., & Viana, R. (2020a). Assessment of pelvic floor muscles in sportswomen: Quality of life and related factors. *Physical Therapy in Sport*, 43, 151–156. <https://doi.org/10.1016/j.ptsp.2020.02.015>
- Pires, T., Moreira, H., Gabriel, R., Fan, Y., Moutinho, O., Viana, S., & Viana, R. (2020b). *Dynamic changes of the pelvic floor in elite athletes of different sports*, 2(13), 89–95. <https://doi.org/10.29352/mill0213.09.00334>
- Pires, T. F., Pires, P. M., Costa, R., & Viana, R. (2020c). Effects of pelvic floor muscle training in pregnant women. *Porto Biomedical Journal*, 5(5), e077. <https://doi.org/10.1097/j.pbj.000000000000077>
- Pires, T., Pires, P., Moreira, H., & Viana, R. (2020d). Prevalence of Urinary Incontinence in High-Impact Sport Athletes: A Systematic Review and Meta-Analysis. *Journal of Human Kinetics*, 73(1), 279–288. <https://doi.org/10.2478/hukin-2020-0008>
- Ptak, M., Ciećwicz, S., Brodowska, A., Starczewski, A., Nawrocka-Rutkowska, J., Diaz-Mohedo, E., Rotter, I., & Franic, D. (2019). The Effect of Pelvic Floor Muscles Exercise on Quality of Life in Women with Stress Urinary Incontinence and Its Relationship with Vaginal Deliveries: A Randomized Trial. *BioMed Research International*, 2019. <https://doi.org/10.1155/2019/5321864>
- Sam, E., Cinislioglu, A. E., Yilmazel, F. K., Demirdogen, S. O., Yilmaz, A. H., & Karabulut, I. (2022). Is biofeedback-assisted pelvic floor muscle training superior to pelvic floor muscle training alone in the treatment of dysfunctional voiding in women? A prospective randomized study. *International Braz J Urol*, 48(3), 501–511. <https://doi.org/10.1590/S1677-5538.IBJU.2021.0687>
- Sigurdardottir, T., Steingrimsdottir, T., Geirsson, R. T., Halldorsson, T. I., Aspelund, T., & Bø, K. (2019). Can postpartum pelvic floor muscle training reduce urinary and anal incontinence?: An assessor-blinded randomized controlled trial. *American Journal of Obstetrics and Gynecology*, 222(3), 247.e1-247.e8. <https://doi.org/10.1016/j.ajog.2019.09.011>
- Sociedade Portuguesa de Ginecologia. (2018). Consenso Nacional sobre Uroginecologia 2021. *Secção Portuguesa de Uroginecologia*, March 2019, 1–331. <https://spginecologia.pt/consenso/11324/>
- Viana, R., Viana, S., Andrade, R., Festas, C., & Neto, F. (2014). Fisioterapia na Autoestima de Mulheres com Incontinência Urinária: Estudo Longitudinal. *Psicologia, Saúde e Doenças*, 15, 170-179. <https://www.redalyc.org/pdf/362/36231157014.pdf>
- Viana, R., Viana, S., Neto, F., & Mascarenhas, T. (2015). Adaptation and validation of the King’s Health Questionnaire in Portuguese women with urinary incontinence. *International Urogynecology Journal and Pelvic Floor Dysfunction*, 26(7), 1027–1033. <https://doi.org/10.1007/s00192-015-2628-6>
- Weber-Rajek, M., Stra¸czyńska, A., Strojek, K., Piekorz, Z., Pilarska, B., Podhorecka, M., Sobieralska-Michalak, K., Goch, A., & Radzimińska, A. (2020). Assessment of the Effectiveness of Pelvic Floor Muscle Training (PFMT) and Extracorporeal Magnetic Innervation (ExMI) in Treatment of Stress Urinary Incontinence in Women: A Randomized Controlled Trial. *BioMed Research International*, 2020. <https://doi.org/10.1155/2020/1019872>
- Whooley, J., Cunnane, E. M., Do Amaral, R., Joyce, M., MacCraith, E., Flood, H. D., O’Brien, F. J., & Davis, N. F. (2020). Stress urinary incontinence and pelvic organ prolapse: Biologic graft materials revisited. *Tissue Engineering - Part B: Reviews*, 26(5), 475–483. <https://doi.org/10.1089/ten.teb.2020.0024>