



The effect of pelvic floor muscle training in urinary incontinent elderly women: a sistematic review

Efeito do treinamento dos músculos do assoalho pélvico na incontinência urinária de mulheres idosas: revisão sistemática

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Abstract

Introduction: The International Continence Society (ICS) determines that the pelvic floor muscles training (PFMT) is the first-choice treatment of urinary symptoms in women. **Objective:** The aim of this study was to systematize randomized controlled clinical trials that address the effects of PFMT in the treatment of urinary symptoms in older women using objective outcome measures. **Method:** Systematic review search was performed eletronic the following databases: Medline, Pubmed, Lilacs, PEDro and manual research conducted in the references of the studies. Were considered eligible women aged over 60 years who performed PFMT in isolation, without the involvement of another technique. The PFMT performed in clinic or at home, with or without the supervision of a therapist and with or without the use of biofeedback as an adjunct. Considered as outcome measures urodynamic studies, voiding diary that assesses daytime urinary frequency, nocturnal urinary frequency, urinary incontinence and exchange absorbent, and, finally, the absorbent test that quantifies loss urinary grams. The assessment of methodological quality of the studies was conducted by PEDro scale. **Results:** Three studies were reviewed in full. Only one trial was rated high

methodological quality. There was significant improvement in urinary symptoms after treatment proposed in the three selected studies. **Conclusion:** Considering the studies available so far are weak the evidence for the use of PFMT in the treatment of urinary symptoms in elderly women.

Keywords: Exercises therapy. Urinary incontinence. Pelvic floor. Aged. Women's health.

Resumo

Introdução: A Sociedade Internacional de Continência (SIC) determina que o treinamento dos músculos do assoalho pélvico (TMAP) seja considerado como primeira opção de tratamento dos sintomas urinários nas mulheres. **Objetivo:** O objetivo deste estudo foi sistematizar ensaios clínicos randomizados e controlados que abordam os efeitos do TMAP no tratamento dos sintomas urinários em mulheres idosas utilizando medidas de desfecho objetivas. **Método:** Revisão sistemática no qual foi feita uma busca eletrônica nas seguintes bases de dados: Medline, Pubmed, Lilacs, PEDro e pesquisa manual realizada nas referências bibliográficas dos estudos. Consideraram-se elegíveis mulheres idosas acima de 60 anos, que realizaram o TMAP de forma isolada, sem envolvimento de outra técnica. O TMAP realizado em ambulatório ou em domicílio, com ou sem a supervisão de um terapeuta e com ou sem o uso do biofeedback como adjuvante. Considerou-se como medidas de desfecho o estudo urodinâmico, o diário miccional que avalia a frequência urinária diurna, a frequência urinária noturna, perda urinária aos esforços e a troca de absorventes, e, por fim, o teste do absorvente que quantifica a perda urinária em gramas. A avaliação da qualidade metodológica dos estudos foi realizada pela escala PEDro. **Resultados:** Três estudos foram revisados na íntegra. Apenas um artigo foi classificado como de alta qualidade metodológica. Houve melhora significativa dos sintomas miccionais após o tratamento proposto nos três estudos selecionados. **Conclusão:** Considerando os estudos disponíveis até o momento são fracas as evidências favoráveis à utilização do TMAP no tratamento dos sintomas urinários de mulheres idosas.

Palavras-chave: Exercício. Incontinência urinária. Diafragma da pelve. Idoso. Saúde da mulher.

Introduction

According to the International Continence Society (ICS), urinary incontinence (UI) is defined as any involuntary loss of urine (1). It is one of the most common problems of public health in elderly women, creating a great impact in the quality of life of the institutionalized population as well as the population that resides in the community (2, 3).

It is a non-inherent change in the aging process, but its incidence is increased linearly with age, which can be considered as a geriatric syndrome due to the high prevalence in these individuals. It is estimated that about 39% of women over 60 years of age show daily urine loss. With this in mind, treatment for urinary incontinences becomes primordial (3, 4, 5).

An efficient treatment for urinary incontinence requires studying women as a whole, taking in consideration not only the pathology, but also the social and emotional aspects involved. Surgical treatment is usually one of the first-choice treatments that come

to mind, however, interest in a more conservative solution has increased. The ICS recommends that the conservative treatment be considered as the first option of intervention in incontinent women (6).

As a first-choice conservative treatment, pelvic floor muscles training (PFMT), as first proposed by Kegel, with the goal to increase support of the inferior urinary tract, as well as promote the urethral closing by involuntary contraction of the periurethral muscles are highly recommended (7). Although the conservative method has shown efficiency in treating adult women (8, 9, 10), in elderly women the focus is still to manage the consequences (11, 12, 13), and not in treating the dysfunction.

Within the outcome measures that can be taken into consideration to evaluate the severity of the urinary symptoms, subjective and objective instruments are mentioned. The objective outcome measures show higher scientific relevance, as they are recommended by the ICS (6). With this, the present study systematizes clinical trials that approach the

PFMT effect when treating urinary symptoms in elderly women that use objective outcome measures as a way to measure the severity of these urinary symptoms before and after PFMT.

Method

The present study is a systematic review of random and controlled clinical trials. An extensive electronic research was made in the month of November, 2012 to identify the relevant articles. The following database was used: MedLine (July, 1970-December, 2012), Pubmed (July, 1970-November, 2012), Lilacs (January, 2000-November, 2012) and PEDro (July, 1984-November, 2012) as well as manual bibliographical reference research of the studies. According to the *Medical Subject Heading of the National Library of Medicine (MeSH)*, *exercise therapy*, *urinary incontinence*, *aged* and *elderly* were used as descriptors.

One reviewer showed search results with potentially eligible articles. Two reviewers assessed the pursuit of eligible articles and an independent third reviewer solved possible disagreements that may have arisen when deciding which articles to include.

Selection of the studies

Only random and controlled clinical trials written in the English language were elected. The criteria used for selecting the articles were studies that treated elderly women with UI using PFMT. To be included in this research we considered studies in which PFMT was utilized in an isolated manner, without the involvement of other technique, studies in which PFMT was performed in an ambulatory or at home, with or without the supervision of a therapist and with or without the use of the biofeedback as an aid.

To analyze the effect of the PFMT within the severity of the urinary symptoms, we took into consideration studies that used as outcome measures the urodynamic study, the urinary diary which evaluates the frequency of daytime urination, nighttime urination frequency, loss of urinary effort, the absorbent exchange and lastly, the absorbent test that quantifies the loss of urine in grams.

We considered short-term results (three months or less after the randomization), medium-term results (between three months to a year after the

follow-up) and long-term results (at least one year of follow-up).

Articles of narrative review, editorials and case studies were not included due to the fact that they did not fit the criteria proposed by this research.

Evaluation of the methodological quality of the studies

The methodological quality of the articles was measured through the PEDro scale (values from 00-10). Once available, the points in the PEDro data base were used; otherwise, the studies were classified in an independent manner by two evaluators and an independent third reviewer that solved potential disagreements that might have appeared along the way. Methodological quality was not an inclusion criteria of the articles. Studies that scored 06 (six) points or higher were considered of high quality (14).

Results

Initially, a total of 596 articles were identified. After removing duplicate articles, 69 articles were selected as eligible possible based on their title names and abstracts (15-83). From these, 65 were excluded after reading the whole article (15-80), 58 because the subjects didn't meet the age requirement that was pre-established in the study, (15-72), 4 because the PFMT was not done in an isolated fashion (73-76), 1 because it presented only subjective evaluations of the urinary symptoms (77) another one for including men and not demonstrating the results separately (78), and the last 2 because they didn't show the control group (79, 80). A flow-chart showing the details of the selection process is shown in Figure 1.

In the end, only 3 studies were included (81-83) in the critical appreciation stage regarding the effects of pelvic floor muscle training when treating urinary symptoms in elderly women (Table 1).

Methodological quality of the studies

The methodological quality evaluation performed by the PEDro scale showed an average score of 06 (4-8). Table 2 shows in details the methodological

quality evaluation of the studies. Two studies compared the PFMT with a control group (81, 83) and one article compared the TMAP with the intra-vaginal electro stimulation (82).

The eligibility and randomization were done in all 3 (three) trials, however, in only 2 (two) of them it became clear how the randomization was done. In all 3 (three) articles, the subjects, as well as all therapists, were not completely blind. Only in the Sherburn et al. (2011) trial all evaluators that measured at least one key results did it in a blindly fashion.

Characteristics of the population included in the studies

The ages averaged between 71 and 79 years. Despite this study consider an elder a person over 60 years of age, the 3 (three) articles chosen used the age of 65, following the criteria of inclusion proposed by the World Health Organization (WHO), which classifies elderly people as individuals with 65 years or more for developed countries and 60 years or more for undeveloped countries (ONU, 1982) (84).

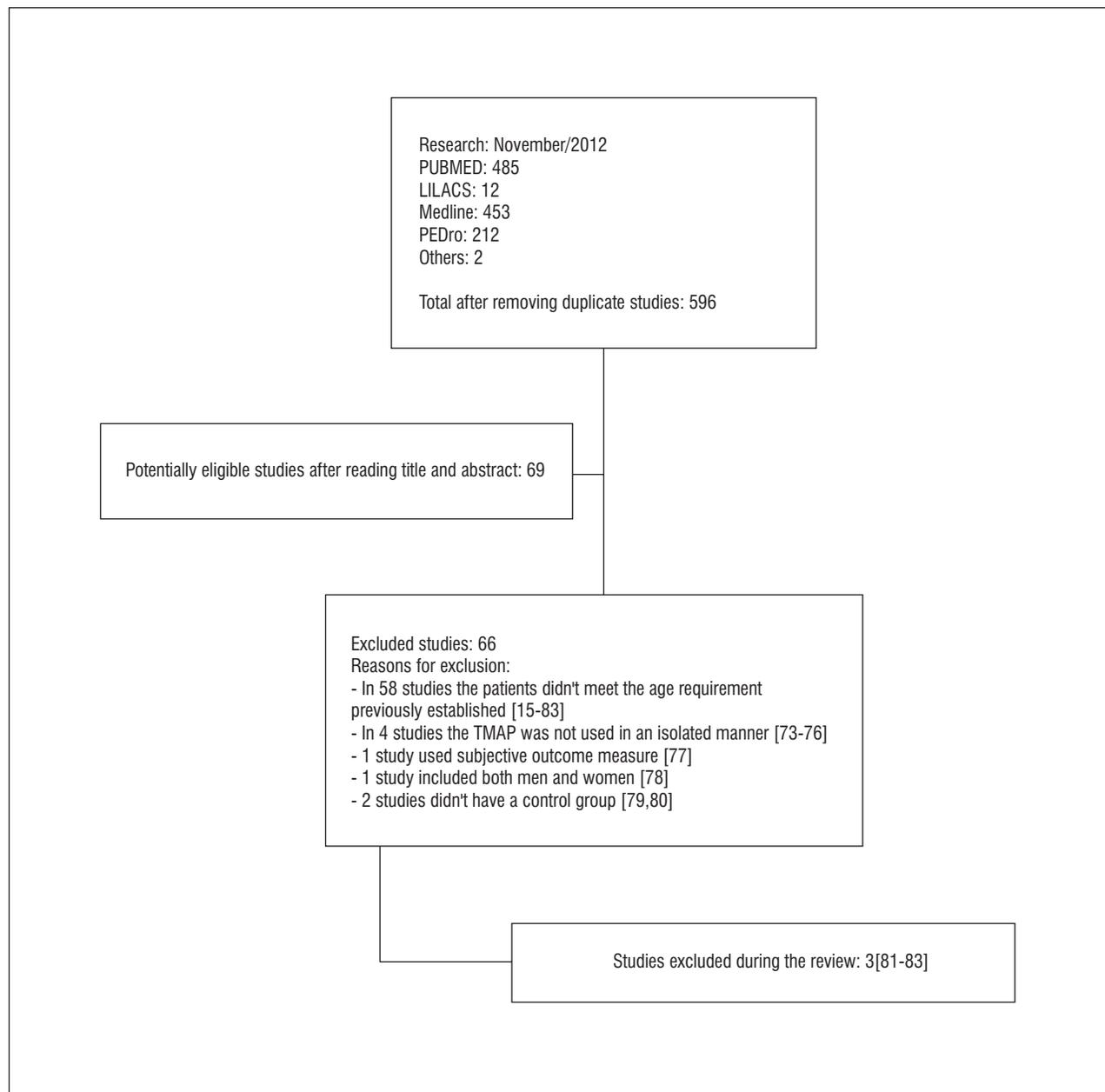


Figure 1 - Detailed flowchart demonstrating the selection process of the studies

Table 1 - Details of the included studies

(To be continued)

Study	Characteristics of the individuals, size of sample	Outcome measures	Design of the study	Results
Sherburn et al, 2011	<p>Age = 71 years (TMAP Group) and 72 years (TB Group)</p> <p>N= 83</p> <p>Inclusion Criteria = Presence of urinary incontinence of effort as diagnosed by the urodynamic study and mini mental test with a score of > 22</p> <p>Exclusion Criteria = previous sessions of physiotherapy in the last 6 months. Neurological causes for urinary incontinence; urinary infection or any other urinary difficulty.</p>	<p>Symptom Evaluation =</p> <p>- <i>Pad-test</i> (10 minutes)</p> <p>- Urine Journal (of 7 days)</p> <p>Quality of Life Evaluation =</p> <p>- ICIQ-SF</p> <p>- AQL- Visual Analogical Scale</p> <p>Follow-up = Not reported</p>	<p>TMAP Group = <u>Educational Component</u> – Patients were oriented to contract the MAP before activities that require strength, they also received orientation regarding normal bladder control and urinary parameters, regarding liquid intake and correct sitting position when using the toilet and the benefits of the exercises. TMAP Exercises – Ambulatory exercises – weekly visits in which they practiced MAP exercises in a group for 45 minutes with the supervision of a therapist: 12 CVM in a sitting position, orthostatic, kneeling and dorsal decubitus. Home exercises – performed 3 (three) times a day in the preferred position with audio feedback. Duration of treatment = 5 months</p> <p>TB Group = <u>Educational Component</u> – patient was oriented to contract the MAP before any activities that require strength, received orientation on normal bladder control and urinary parameter and orientation regarding liquid intake and correct sitting position in the toilet as well as the benefits of the exercises, urination delay program, diaper use progression, skin care, bladder deflation dynamic, relaxing and breathing as a means to control the urination allowing its delay. <u>Breathing and Relaxation Exercises –</u> stretching exercises, having consciousness of your breathing and relaxation without having specific exercises for those with MAP. Duration of Treatment = 5 months</p>	<p>The TMAP group showed superior improvement when compared to the training of the bladder Group regarding the reduction of urinary loss in the <i>Pad-test</i> with previous contraction of the MAP before the effort exam after 3 months of treatment ($p = 0.04$) and without previous contraction of the MAP after 5 months of treatment ($p = 0.03$).</p> <p>Reduction of the number of urinary loss in the urinary journal after one months of training ($p = 0.05$)</p>

Table 1 - Details of the included studies

(To be continued)

Study	Characteristics of the individuals, size of sample	Outcome measures	Design of the study	Results
Spruijt et al, 2003	<p>Age = 72 years (EIV Group) and 74 years (TMAP Group)</p> <p>N = 37</p> <p>Inclusion Criteria = Women over 60 years of age with urinary incontinence of any sort, symptoms of incontinence for over a period of 3 months; a registered urinary loss of over 10cc in the 24 hour <i>pad test</i>.</p> <p>Exclusion Criteria = Infection in the lower urinary tract, urinary dysfunctions caused by fistulas, tumors, pelvic irradiation or neurological conditions; any other treatment in the past 6 months; genital prolapse that goes beyond the vaginal entrance; use of a cardiac pacemaker and mental deficiency</p>	<p>Symptom Evaluation =</p> <ul style="list-style-type: none"> - 48 hour <i>Pad test</i> - Urodynamic Study - Self-evaluation of the gravity of the urinary incontinence by the PRAFAB Scale. <p>MAP Evaluation =</p> <ul style="list-style-type: none"> - Perineometry of the MPA <p>Follow-up = not performed</p>	<p>TMAP Group = Home exercises without any supervision</p> <p>Protocol written in the German language</p> <p>Duration of Treatment = 8 weeks</p> <p>EIV Group = biphasic current with a duration of 1ms, frequency of 50Hz (IUE) or 20Hz (IUU), 30 minutes of application with 5 minute intervals after the 15th minute.</p> <p>3 times a week in a total of 24 sessions</p> <p>Duration of Treatment = 8 weeks</p>	<p>There was no significant improvement when comparing both groups in relation to the <i>Pad-test</i> ($p = 0.08$), the urodynamic study ($p = 0.85$), the quantity of urinary loss ($p = 0.32$), and the frequency of urinary losses ($p = 0.30$) evaluated by an item of the PRAFAB; perineometry (0.24). PRAFAB score ($p = 0.89$). However, there was a 36.4% improvement when comparing the before and after treatment in the TMAP Group and a 29.2% improvement in the EIV treatment.</p>
Aslan et al, 2007	<p>Age = 78 years (TMAP Group) and 79 years (Control Group)</p> <p>N = 50</p> <p>Inclusion Criteria = Women who have been institutionalized for at least 6 months and had regular complaints of urinary loss</p> <p>Exclusion Criteria = Women who had neurological or chronic diseases that affected their daily life activities (severe paralysis, dementia, arthritis, fractures); mini mental exam <22; Rankin Scale above 3; insufficient alphabetization level and motor abilities to register their data</p>	<p>Evaluation of Symptoms =</p> <ul style="list-style-type: none"> - <i>Pad-test</i> (1 hour) <p>MAP Evaluations =</p> <ul style="list-style-type: none"> - Digital Palpitations of the MAP <p>Follow-up = 06 months</p>	<p>TMAP TB Group = Educational Component</p> <ul style="list-style-type: none"> - patient received explanations about the structure of the inferior urinary tract, about the mechanisms of continence, MAP, about problems related to urination, about how to perform the TB and the TMAP and how to register the data <p>They were taught how to urinate in regular intervals, as well as how to overcome the urgency to urinate by keeping their breathing stable and mentally solve games like puzzles so as to delay their need to urinate.</p> <p>TMAP Exercises - home exercises – patient was oriented to perform the MAP contractions to the maximum extent during their daily life activities</p>	<p>There was significant improvement in the group that had an intervention in the urgency ($p = 0.02$) and urinary frequency ($p = 0.000$), nocturia ($p = 0.00$), <i>pad-test</i> ($p = 0.00$) after 08 weeks of treatment. The nocturia also showed improvement after 06 months ($p = 0.004$)</p>

(Conclusion)

Table 1 - Details of the included studies

Study	Characteristics of the individuals, size of sample	Outcome measures	Design of the study	Results
Aslan et al, 2007			Ambulatory visit – 3 to 4 times a week to observe the evolution of the TB and to answer any questions related to the TMAP Duration of treatment = 6 to 8 weeks Control Group = Didn't receive treatment	

Note: MAP = Pelvic floor muscles; TMAP = Training of the pelvic floor muscles; TB = Bladder training; EIV = Intra-vaginal electro stimulation; IUE = Effort of urinary incontinence; IUU = Urgency urinary incontinence; ICIQ = AqoL Assessment of Quality of Life; ICIQ-UI-SF = Disease specific symptom and bother measure; PRAFAB = Protection, Amount, Frequency, Adjustment, Body image; CVM = Maximum voluntary contraction.

Table 2 - PEDro scale for the methodological evaluation of the included studies

Study	E ^a	01	02	03	04	05	06	07	08	09	10	Total
Sherburn et al, 2011	+	+	+	+	-	-	+	?	+	+	+	8
Spruijt et al, 2003	+	+	?	+	-	-	?	+	-	+	+	5
Aslan et al, 2008	+	+	-	+	-	-	-	-	=	+	+	4

Note: E^a = Eligibility; 01 = Randomization; 02 = Allocation of subjects; 03 = Similar groups in what concerns important prognosis indicators; 04 = Blind subjects; 05 = Blind therapists; 06 = Blind evaluators; 07 = Adequate follow-up; 08 = Intention of treatment; 09 = Comparison between groups; 10 = Estimated points and variability; + = The criteria is clearly satisfactory, - = The criteria is not satisfactory; ? = It's unclear if the criteria is satisfactory; a = Eligibility criteria didn't contribute to the overall score.

In 2 (two) of the studies, the sample was composed by elderly women that live in a community. Only the Aslan et al study evaluated the training of the pelvic floor muscles in women living in long term institutions. According to the PEDro scale, all studies reached similar results in what concerned more important prognosis indicators.

Training program of the pelvic floor

The studies turned out to be heterogenic in relation to the TMAP program. The duration of the treatment varied between 6 (six) weeks (82, 83) to 5 (five) months (81) and the number of sessions per week was a variable in all 3 (three) studies. Learning to contract the MAP was done by vaginal palpation in 2 (two) of the studies (82, 83) and in another one, the process of learning to contract the MAP was not described. Weekly sessions were held, accompanied by a specialized therapist in TMAP. The execution of the daily home exercises was solicited in all studies (82, 83).

Outcome measures used to evaluate urinary symptoms

The objective evaluation of urinary symptoms used in the studies were: the urine journal (81, 83), the urodynamic study (82), the related frequency of urinary loss episodes (81, 83), and the pad-test [81, 83]. The 10 minute pad-test [81], the 1 hour pad-test (83) and the 48-hour pad-test (82) were used.

A significant improvement was observed in the urinary symptoms after the proposed treatment in 2 (two) or 3 (three) selected studies (81, 83). Taking in consideration the pad-test as the main source of evaluation, we were able to see a significant improvement in favor of the TMAP in the Sherburn et al. and Aslan et al. trials ($p = 0.04$ and $p = 0.00$, respectively). There was also a significant improvement in favor of the PFMT group when the urinary journal was analyzed (81, 83). Only one study (82) didn't show significant difference in the evaluation of the urodynamic parameters between the group that performed the PFMT and the group that performed the intravaginal electro stimulation.

Discussion

The literature identified in this review regarding the PFMT in urinary symptoms within elderly women is scarce and the studies are of low methodological quality. Although the efficiency is not proven in this population, preliminary evidence exists that suggest that this type of treatment with the elders is useful and deserves further investigations (85).

The PFMT is a simple method and it is frequently used. The ICS recommends that conservative treatment be the first option of intervention in incontinent women. Meta-Analysis studies prove the effectiveness of PFMT in urinary symptoms of incontinent women (86). However, this therapy hasn't really been used that much in elderly women. The majority of the studies associate PFMT with another technique, which is the primary limitation of this research and, consequently, the reason why most studies have been eliminated (73-75).

Nevertheless, considered as eligible studies were the articles that associated bladder control with PFMT because they all (81-83) provided instructions to the patients on the appropriate liquid intake, normal bladder control and correct urination position. This could be considered a factor of misunderstanding and the result of these studies must be interpreted with caution.

A lot is being written about the effects of bladder training or behavioral therapy in the elderly because this works well according to the cognitive capacity of the patient and it is a common intervention in senior care facilities. It is composed of measures of programmed urination, immediate urination or re-education of urinary habits. A vast analysis about behavioral training concluded that there is evidence that multiple interventions, including combination of bladder control techniques, PFMT (with or without biofeedback), educational strategies of urination control and self-monitoring are efficient in treating urinary incontinence in independent seniors (87).

Currently there are no guidelines establishing the best treatment protocol for PFMT. None of the chosen studies made use of the biofeedback as a form of PFMT. The current available literature proves that PFMT is efficient in treating women with urinary incontinence (88, 89). In this review, 4 (four) articles used biofeedback as a form of TMAP as a treatment for the urinary symptoms in elderly women. However,

none of them followed the inclusion criteria (74, 77, 79, 80).

As for the supervision, only the Sherburn et al. (81) study utilized PFMT in a supervised manner. Spruijt et al. (82) evaluated and provided instructions on how to contract the pelvic floor through vaginal palpitation only on the first meeting. On the other hand, on the Aslan et al. (83) study there were frequent meetings, but no supervised sessions, only an interview at the end of each week to know how the program was evolving. Findings on the supervision of the training are questionable. Felicíssimo et al., comparing the supervised and not supervised PFMT, didn't find any difference between the two groups (90). Zanetti et al., on the other hand, concluded that women that perform the PFMT in a supervised manner show superior results when compared to those that perform without supervision (91). Still, in none of these studies the observed population was composed of elderly women.

Studies that show an agreement between the subjective tools of evaluation are still a conflict (92, 93). It has already been proven that the PFMT brings an improvement in the subjective factors as well as the life quality of women with urinary incontinence (94). However, when this question is directed towards the elderly population, no study can be found. Sherburn et al. (81) found an improvement in the evaluated symptoms with the pad test and urinary journal, but when the life quality before and after was evaluated, there was no difference at all. In the Aslan et al. (83) study, it can be observed that in the King Health Questionnaire the results of urinary incontinence didn't affect women on a great scale. It was identified that the general perception of health kept higher scores on both groups.

The method of evaluation varied, being that the only tool of evaluating the present urinary symptoms on all three of them was the Pad-test. Nevertheless, the way it was carried out was different in all three articles. ICS preconizes as an evaluation method of the 24 hour Pad-test (95), however, this form of evaluation can have limiting factors in the female population.

Studies have shown that there is a significant increase in absorbent weight in women when they are in the menopausal transitional phase and women that are in the post-menopausal phase. Women in the post-menopausal phase that don't use hormonal therapy also show significant increase in the absorbent

weight, when compared with those that do make use of hormonal replacement therapy.

With this, environmental conditions, usage of hormonal therapy and menopausal states are all factors considered relevant when using the Pad-test as a form of evaluation in this population (96).

Franco et al compared the one-hour Pad-test with subjective outcomes, such as the analogical visual scale, severity of symptoms scale, *Stamey grade*, in addition to the evaluation of life quality through the surveys: *Urogenital Distress Inventory* (UDI-6), *Incontinence Impact Questionnaire* (IIQ-7), and the *International Conference on Incontinence Questionnaire* (ICIQ-SF). The results showed that only the ICIQ-SF had a correlation with the Pad-test (97).

When we analyzed the urinary journal, only 1 (one) article (81) kept the records of over a period of 7 (seven) days. The article written by Aslan et al. (82) only evaluated the daytime and nighttime frequency in question form and presented the results separately, which made it impossible for us to make a deeper comparison. A recently published study evaluated the association of the urinary symptoms with the urinary journal and the cystometric parameters, showing that not only the daytime frequency but the nighttime frequency as well also show significant associations, proving that the urinary journal is a way to evaluate urinary symptoms (98).

It was not possible to keep up with the long term treatment results. Only Aslan et al accompanied the patients over a period of 6 (six) months. In a recent systematic review, it was concluded that PFMT is efficient in treating women with UI on the long run, even without the incentive to continue with the home exercises. However, the study included women of all age groups (99).

Despite methodological diversity between researches, studies show that PFMT seems to be more efficient in treating urinary symptoms in elderly patients. In all articles used, it was possible to identify an improvement in urinary symptoms in the elderly women population. This research corroborates with another review study that was recently published. However, Pereira et al included in their study other types of treatment — the training of the pelvic floor as well as intra-vaginal electro stimulation. They also evaluated the urinary symptoms through subjective methods like questionnaires on life quality and analogical evaluation scale (85).

The results regarding PFMT are encouraging, however, the fact that there are only 3 (three) articles that actually make use of this therapy in the elderly population limits our conclusions.

Conclusion

Taking in consideration the available studies up to this moment, the evidence favorable towards the usage of PFMT in treating urinary symptoms in elderly women is weak.

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