

Effects of physiotherapy on female urinary incontinence

Efeitos da fisioterapia na incontinência urinária feminina

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ABSTRACT | INTRODUCTION: Urinary incontinence is defined as any involuntary loss of urine, with females being the most affected. It is classified into three types: stress urinary incontinence; urgency; and mixed. Physiotherapy in the treatment of urinary incontinence consists of normalization of the tone of the pelvic floor muscles, using kinesiotherapy and transcutaneous electrostimulation of the posterior tibial nerve. **OBJECTIVE:** To evaluate the effects of physiotherapy on female urinary incontinence. **METHODOLOGY:** It was a clinical, longitudinal and prospective study. The study included 27 women with a mean age of 57.4 years, diagnosed with urinary incontinence, referred for treatment at the School Physiotherapy Outpatient Clinic. They answered a questionnaire to assess demographic and clinical data and the ICIQ-FS quality of life questionnaire, before and after physiotherapeutic intervention through kinesiotherapy and posterior tibial electrostimulation. **RESULTS:** Most women had stress urinary incontinence (55.6%), and 33.3% (n=9) reported urinary losses from 01 to 04 years and 33.3% (n=9) from 04 to 08 years. The frequency of urinary losses before treatment in the majority (55.6%) was several times a day and after treatment the majority (55.6%) lost once a week or less. There was a significant decrease in the comparison of the ICIQ Score before and after physical therapy treatment ($p < 0.0001$). **CONCLUSION:** Physiotherapy, through kinesiotherapy and electrostimulation, is effective in the treatment of female urinary incontinence.

KEYWORDS: Urinary incontinence. Physiotherapy. Electrostimulation. Electrical stimulation. Stress urinary incontinence.

RESUMO | INTRODUÇÃO: A incontinência urinária é definida como qualquer perda involuntária de urina, sendo o sexo feminino o mais atingido. É classificada em três tipos: de esforço, de urgência e mista. A fisioterapia no tratamento de incontinência urinária consiste na normalização do tônus dos músculos do assoalho pélvico, utilizando cinesioterapia e eletroestimulação transcutânea do nervo tibial posterior. **OBJETIVO:** Avaliar os efeitos da fisioterapia na incontinência urinária feminina. **METODOLOGIA:** Tratou-se de uma pesquisa clínica, longitudinal e prospectiva. Participaram do estudo 27 mulheres com idade média de 57,4 anos, com diagnóstico de incontinência urinária, encaminhadas para tratamento em Ambulatório de Fisioterapia Escola. As mesmas responderam um questionário de avaliação dos dados demográficos e clínicos e o questionário de qualidade de vida ICIQ-FS, antes e após intervenção fisioterapêutica por meio de cinesioterapia e eletroestimulação tibial posterior. **RESULTADOS:** A maioria das mulheres possuía incontinência urinária de esforço (55,6%), sendo que 33,3% (n=9) referiram perdas urinárias de 01 a 04 anos e 33,3% (n=9) de 04 a 08 anos. A frequência de perdas urinárias antes do tratamento na maioria (55,6%) era diversas vezes ao dia e após o tratamento a maioria (55,6%) perdia uma vez por semana ou menos. Houve diminuição significativa na comparação do ICIQ Score antes e após o tratamento fisioterapêutico ($p < 0.0001$). **CONCLUSÃO:** A fisioterapia, por meio de cinesioterapia e eletroestimulação, é eficaz no tratamento da Incontinência Urinária feminina.

PALAVRAS-CHAVE: Incontinência urinária. Fisioterapia. Eletroestimulação. Estimulação elétrica. Incontinência urinária de esforço.

Introduction

According to the International Continence Society, urinary incontinence (UI) is defined as involuntary urine loss, which causes social and hygienic discomfort, and may be objectively evident¹.

Urinary incontinence is classified into three types: stress urinary incontinence (SUI), characterized by urine loss after increased intra-abdominal pressure at minimal exertion, such as coughs and sneezing; urge urinary incontinence (UIU), defined by sudden and uncontrollable urge to urinate; and mixed urinary incontinence (IUM), when there are symptoms of SUI and UIU².

The Brazilian population today is approximately one hundred and ninety million inhabitants, 56% of them women and of these one third are affected by UI. It is estimated to reach 14% to 57% of women aged between 20 and 89 years^{1,3}.

The female sex is the most affected by urinary incontinence due to estrogen deficiency, considering its important role in pelvic support and control of collagen synthesis and degradation. Another highlighted factor is parity, which increases the chances of UI at each delivery by 27.3%^{2,4}.

The etiology is multifactorial, but several risk factors are associated, such as pregnancy, types of delivery, parity, obesity, anatomical abnormalities of the urethra, menopause, diabetes mellitus, intestinal constipation, smoking, chronic asthma, medications, natural aging of muscle fibers, heredity, daily caffeine intake, and lifestyle (excessive water intake or long holding urine) significantly increase the chance of developing UI⁵⁻⁸.

In addition to physical alterations, psychosocial disorders of this condition are extremely important because they limit the individuals' autonomy, decreasing their self-esteem and influencing daily activities and social interaction, causing depression, isolation and absenteeism at work⁹⁻¹¹.

It is noteworthy that the delay or not of the search for treatment of urinary incontinence is due to the fact that it is mistakenly considered a natural aging process as well as the lack of knowledge on the subject, shame and fear of consulting professionals' health care^{2,9}.

Prevention and control of signs and symptoms should be performed through guidance on lifestyle changes, better control of health problems and strengthening of pelvic floor muscles. The International Continence Society recommends that conservative treatment be the first intervention option in UI, aiming at increasing pelvic floor muscle strength, being performed in an integrated manner with the multidisciplinary team¹⁰.

Physiotherapy as a treatment for UI is based on the training of normalization of pelvic muscle tone and body perception, using resources such as kinesiotherapy, vaginal cones, biofeedback and electrostimulation¹². Transcutaneous electrostimulation of the posterior tibial nerve is an effective way in the treatment of UI because it is low cost, does not present side effects and provides less embarrassment and discomfort to patients⁹.

In this type of electrostimulation, the somatic afferent fibers of the lumbar and sacral regions depolarize, thus causing the inhibition of bladder activity with both motor and sensory response through stimulation in the posterior tibial nerve region^{11,12}.

The effects of physical therapy intervention on female urinary incontinence are widely studied in the current literature, however, few studies present a detailed protocol of exercises associated with electrostimulation, limiting its use in daily clinical practice.

Thus, this study aimed to evaluate the effects of a physiotherapeutic protocol on female urinary incontinence.

Materials and methods

All women who attended the Urogynecological Physiotherapy outpatient clinic from January to November 2019 participated in the research. The study included women, older than 18 years, with medical and urodynamic diagnosis of urinary incontinence, referred for treatment at the Urogynecological Physiotherapy Outpatient Clinic of a Teaching Hospital. The patients were divided by the type of urinary incontinence (stress or mixed) confirmed by the clinic and the urodynamic study, being 44.4% (n=12) mixed incontinence and 55.6% (n=15) of stress.

Women who agreed to participate in the survey signed a free and informed consent form.

Patients who didn't have urodynamic examination, patients diagnosed with neurogenic bladder, as well as patients with physical-functional alterations that make it impossible to perform the exercises were excluded from the study. In addition to those who had pacemakers, metallic implants, during pregnancy or who had some skin lesion or hypoesthetic region, which against indicating the use of electrostimulation.

The patients were submitted to evaluation using the demographic and clinical data evaluation questionnaire and the ICIQ-SF quality of life questionnaire before treatment and immediately after 10 sessions.

The physiotherapeutic protocol consisted of kinesiotherapy and electrostimulation. The patients performed one physiotherapy session per week, with a duration of 45 minutes, totaling 10 sessions.

The ICIQ-SF values were used as an improvement parameter, which has a total score ranging from zero (best) and 21 (worst), as well as questions related to the clinic.

This research was approved by the Research Ethics Committee (CAAE: 92348418.7.0000.5415).

Kinesiotherapy for Pelvic Floor Rehabilitation

Patients were applied a 10-minute program of pelvic floor strengthening exercises.

Exercise 1

Patient standing, with his hands at the waist and legs apart, was instructed to contract the pelvic floor muscles for 10 seconds and relax, repeating 10 times.

Exercise 2

Sitting patient, with a cushion between the legs, was instructed to tighten the cushion and contract the pelvic floor muscles for 10 seconds and relax, repeating 10 times.

Exercise 3

Patient in supine position, asked to raise the hip of the bed, contracting the pelvic floor muscles for 10 seconds and relax, returning to the initial position, repeating 10 times.

Exercise 4

Patient leaning against a wall, oriented inspire and, when exhaling, descend flexing the knees while contracting the pelvic floor, repeating 10 times.

Electrostimulation

Electrostimulation was performed using the Quark® Dualpex 961 (Brazil) device, intended for pelvic floor rehabilitation, in which silicone electrodes are used, positioned in the posterior tibial nerve path.

The patient was positioned in supine position, with semiflexion of the knee and the two silicone electrodes positioned with gel, one immediately behind the medial malleolus of the right ankle and another 10 centimeters above it, being fixed with micropore tape. The programs adopted in the device were according to the type of urinary incontinence of the participants, detailed as follows:

- Stress Urinary Incontinence: P07 Program; frequency of 50 Hz; time of 20 min and intensity adjusted according to the sensitivity of the participant.
- Mixed Urinary Incontinence: Program P01; frequency of 04 Hz; time of 20 min and intensity adjusted according to the sensitivity of the participant + Program P07; frequency of 50 Hz; time of 20 min and intensity adjusted according to the sensitivity of the participant.

Statistical analysis

Descriptive statistical analysis was performed based on the calculations of the measures of central tendency and dispersion and frequency counts.

For the inferential statistical analysis of the quantitative variables, the Kolmogorov Simirnov Test was used to verify the normality of the data, and the Wilcoxon test of paired parametric data.

In all analyses, a P value ≤ 0.05 was considered statistically significant. The programs used were SPSS (IBM, version 23, 2014) and Graphpad Instat (version 3.10, 2009).

Results

The study included 27 women. The mean age of the patients was 57.4 years (SD = 9.7), the majority were married (59.25%), white (88.88%) and complaining of stress urinary incontinence (55.6%).

Regarding the time of onset of symptoms, 33.3% (n=9) reported urinary losses from 01 to 04 years and 33.3% (n=9) from 04 to 08 years (Table 1). 33.3% (n=9) reported urinary losses from 01 to 04 years and 33.3% (n=9) from 04 to 08 years (Table 1).

Table 1. Time of onset of symptoms

Start time	N (%)
Less than 06 months	02 (7,4 %)
Less than 01 year	04 (14,81%)
From 01 to 04 years	09 (33,3%)
From 04 to 8 years	09 (33,3%)
From 08 to 15 years	02 (7,4 %)
More than 20 years	01 (3,7%)

Most women (70.37%; n=19) reported that since the onset of the symptom they noticed some improvement, 18.51% (n=5) perceived worsening, and 11.11% (n=3) reported that the symptom remained the same.

A total of 70.37% (n=19) of the participants reported having already undergone some gynecological surgery. Regarding physical activity, most women didn't perform any type of exercise (59.25%; n=16), and 29.62% (n=8) reported avoiding doing something because of urine loss. Regarding life habits, 92.59% stated that they were not smokers (n=25) and 85.18% said they did not drink alcohol (n=23). Regarding their sexual activity, 59.25% (n=16) of the women had an active sexual life.

When asked about their life, 59.25% of the participants (n=16) stated that they considered their life good (Table 2).

Table 2. Quality of Life

Life	N (%)
Great	05 (18,51%)
Good	16 (59,25%)
Bad	05 (18,51%)
Lousy	01 (3,7 %)

Regarding pain, 48.14% (n=13) reported pain in the pelvic region. 74.07% (n=20) reported associated diseases, however 77.77% (n=21) reported continuous use of medication.

The frequency of urinary losses before treatment in most women (55.6%) was several times a day and after treatment reported losing 48.1% once a week or less. (Table 3).

Table 3. Frequency of urinary - ICIQ-SF

Frequency	Before Physiotherapy	After Physiotherapy
	N(%)	N(%)
Never	0	5 (18,5)
Once a week or less	1 (3,7%)	13 (48,1%)
Two or three times a week	2 (7,4%)	2 (7,4%)
Once a day	5 (18,5%)	1 (3,7%)
Several times a day	15 (55,6%)	6 (22,2%)
All the time	4 (14,8%)	0

Considering the amount of urine lost, before treatment 48.1% of the participants reported losing a moderate amount, and at the end of treatment 55.6% of the women reported a small amount lost. (Table 4).

Table 4. Amount of urine lost - ICIQ-SF

Lost quantity	Before Physiotherapy	After Physiotherapy
	N (%)	N (%)
No	0	5 (18,5%)
A small amount	4 (14,8%)	15 (55,6%)
A moderate amount	13 (48,1%)	7 (25,9%)
A large amount	10 (37%)	0

The mean interference of urinary loss in Activities of Daily Living by ICIQ-SF before treatment was 7.26% (SD=2.77) and after treatment decreased to 2.81% (SD=2.86).

Regarding the occurrences of urinary losses, the losses of greater relevance both before and after treatment occurred when coughing and/or sneezing and before reaching the bathroom, respectively. (Table 5).

Table 5. Occurrences of urinary losses - ICIQ-SF

Urinary losses	Before Physiotherapy	After Physiotherapy
	N (%)	N (%)
Never	0	6 (22,2%)
I lose before I get to the bathroom	20 (74,1%)	10 (37%)
I lose when I snare or sneeze	24 (88,9%)	18 (66,7%)
I lose when I'm sleeping	13 (48,1%)	5 (18,5%)
I lose when I'm doing physical activity	15 (55,6%)	5 (18,5%)
I lose when I'm done urinating and I'm getting dressed	8 (29,6%)	3 (11,1%)
I lose for no obvious reason	7 (25,9%)	1 (3,7%)
I lose all the time	4 (14,8%)	1 (3,7%)

There was a significant decrease by the Wilcoxon test ($p < 0.0001$) in the comparison of the ICIQ Score before and after physical therapy treatment.

Discussion

In the present study, the average age of the participants was 57.4 years and the most prevalent type of incontinence was exertion, followed by mixed urinary incontinence (MUI), such data are consistent with the study by Fernandes et al.⁹ where the average age of women was 50.01 years and 71.9% of the sample had SUI, also corroborating Henkes et al.¹⁰ who demonstrated an average age of 45 years, where 66.66% of their sample presented SUI versus 22.22% with a diagnosis of MUI. On the other hand, Carvalho et al.⁷, who evaluated the impact of urinary incontinence on the lives of the elderly, found a mean age of 68.56 years and 40.91% of the women were incontinent. Of these, it states a higher prevalence of MUI (38.8%) compared to the SUI (33.3%). Most of them reported losing urine once a week or less (23.5%).

Most women with UI related studies are married, a fact confirmed in the present study. This may be a relevant fact, since UI has a negative impact on women who maintain an active sex life due to the embarrassment caused by urine leakage⁹.

In the present study, the results on the time of onset of symptoms corroborate the findings of Fernandes et al.⁹, and most of the women in their sample lost urine 05 or less years ago (35.1%) and 10 or more years ago (35.1%), and Knorst et al.¹ who stated that 75% of the participants had UI time ≤ 10 years.

It is believed that most women delay to seek treatment for the problem, due to the fact that they consider ui to be something "normal", or because they do not know the physiotherapeutic treatment and imagine that the treatment for UI would be only surgical¹⁰.

The physiotherapeutic intervention was based on electrostimulation of the posterior tibial nerve and kinesiotherapy to strengthen the pelvic floor muscles, evidencing significant results in the quality of life of patients and urinary loss after treatment, evidenced by the ICIQ score – SF. Corroborating with Knorst et al.¹ who also associated kinesiotherapy and electrostimulation, stating that this junction proved effective since most women reported being continents at the end of the Treatment.

Similarly, Shen & Liu¹⁵ retrospectively evaluated the effects of eletreostimulation in 163 women with urinary incontinence after stroke through ICIQ-SF. The authors identified that after 08 weeks of treatment the patients showed significant improvement in the amount of urine leakage. The ICIQ-SF questionnaire was applied before and after the end of treatment,

being a short and easy-to-apply questionnaire to assess quality of life. According to the score obtained, the interference of UI in the woman's daily life is confirmed by means of her score and classified as mild (1-5), moderate (6-12), severe (13-18) and very severe (19-21)³. The score obtained showed a significant difference in the values before and after treatment. The mean score was 15.03±3.7 and after the end of treatment 6.67±5.0 with p value <0.0001. In the present study, this interference can be considered severe for before treatment and moderate after the end of the 10 physiotherapy sessions.

There are several methods used in the treatment of urinary incontinence, from conservative to surgical treatments, such as botulinum toxin application, implants in the sacral region, among other invasive treatments and cost and higher risk^{11,12,14}. Since 2005, the International Continence Society has indicated physiotherapy as a first-line treatment and gold standard for the treatment of UI, due to its high effectiveness, low risks and affordable cost. Physiotherapy in the treatment of UI is of paramount importance to return the perception and functionality of PFM, making the woman have control over her sphincter, thus returning urinary continence and improving her quality of life^{10,13}.

Costa and Santos¹³ reaffirm the importance of a perineal education program. In this program, we should prioritize the information to the patient about concepts of what is urinary incontinence, what the function of the pelvic floor and bladder, what is PFMT, how to perform the contraction of the perineum and the objectives of physiotherapeutic treatment.

In the study by Henkes et al.¹⁰, most participants reported that the therapeutic exercise program reduced urine loss and contributed to UI improvement. The interviewees also reported following the home guidelines thus demonstrating the awareness about their problem, and the importance of the active participation of the individual suffering from UI in improving the clinical picture.

Few studies have details of physical therapy protocols, especially in relation to the exercises performed, when associated with electrostimulation. Thus, this study presented a detailed protocol that promoted the improvement of urinary incontinence, showing

the reduction of symptoms and improvement in quality of life, assessed by the ICIQ-SF.

A larger sample number that allows us to separate patients into two study groups (stress urinary incontinence and mixed urinary incontinence), as well as a control group, would be of great importance for future research, being considered a limiting factor in current research.

Conclusion

Physiotherapy, through a detailed protocol of kinesiotherapy and electrostimulation, decreased symptoms and improved the quality of life of women with urinary incontinence.

Author contributions

Cavenaghi S participated in the conception, design, collection, analysis and interpretation of data, and writing of the article. Lombardi BS participated in the collection, analysis and interpretation of data, and writing of the article. Bataus SC participated in the conception, design and data collection. Machado BPB participated in the writing of the article.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

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