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KINESIOTHERAPY AND ELECTROSTIMULATION IN FEMALE URINARY INCONTINENCE

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ABSTRACT
Urinary incontinence is defined as any involuntary urinary loss and is a social and hygienic problem. The objective of this study was to analyze the effectiveness of physiotherapeutic treatment in reeducating the pelvic floor musculature of women with urinary incontinence through kinesiotherapy versus electrostimulation. It is a quasi-experimental study conducted at the FisioUNISC clinic between October 2007 and May 2008. The study assessed the strength of perineal musculature contraction in 36 women, using digital perineometer, pad test and the King's Health Questionnaire (KHQ). Therapy was applied to two distinct groups: the first one was subjected to kinesiotherapy while the second one to electrostimulation. Each group completed 20 treatment sessions three times a week. Reduced urine loss and subsequent progression of vaginal contraction strength in the two investigated groups were observed by means of the pad test, with kinesiotherapy expressing better results. The KHQ showed similar results, with improved scores for both groups and higher scores in the kinesiotherapy group. The results showed improvement in urinary incontinence with both treatments; however, kinesiotherapy was the most effective option.

Keywords: Urinary incontinence. Quality of life. Electric stimulation therapy. Exercise therapy.

INTRODUCTION

Urinary incontinence (UI) is defined by the International Continence Society as any involuntary urine loss, which stands as a social and hygienic problem[1]. This incontinence is a condition that affects one's daily activities and quality of life, being capable of compromising his or her physical, emotional, psychological and social wellbeing, as well as his or her sexual life[1,2].

In Brazil, research data indicate that in 2012 the Brazilian population comprehended around 190 million inhabitants, of which approximately 56% were female. About one-third of the population of women is affected by UI[3,4]. In another study, the prevalence of UI in women ranged from 5.8% to 72%, affecting the female population studied from the ages of 12 to 80[5].

Although it is an underdiagnosed condition, some women do not report urinary dysfunction due to embarrassment or for considering it a natural occurrence of aging[4].

Traditional therapies used to treat UI are performed through techniques that aim to strengthen the pelvic floor muscles[6]. These techniques are the most widespread ones for UI treatment due to their low financial cost, low risk and proved effectiveness[7].

In view of the above, the present study had as objective to analyze the effectiveness of physiotherapeutic treatment in reeducating the pelvic floor musculature of women with UI through kinesiotherapy versus electrostimulation.

METHODOLOGY

This is a quantitative study with a quasi-experimental design conducted at the Physiotherapy clinical school of the University of Santa Cruz do Sul [Universidade de Santa Cruz do Sul]/ RS - FisioUNISC. It was carried out from October 2007 to May 2008. The sample comprised 36 women aged between 30 and 74 years old.

Initially, posters were distributed by means of printed and electronic media at the FisioUNISC clinic announcing the research. Those interested in participating in the study were assessed as to the presence of UI. As inclusion criteria, women with UI complaints and who were willing to attend the scheduled meetings were selected. As exclusion

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criteria, women under the age of 30, as well as those with pathologies such as uterine and bladder cancer and pelvic organ prolapse, did not participate in the study.

The volunteers who were available to participate signed the Free and Informed Consent Form after being explained about the study's objective, investigative procedure, risks and benefits, in compliance with Resolution No. 466/2012 of the National Health Council, approved by the Research Ethics Committee (CEP-1864/07).

Of the 36 participants who accepted to join the study, a random selection was done for distribution into the treatment groups. Out of these ones, 18 were allocated in the electrostimulation (EG) and 18 to the kinesiotherapy (KG) group. The treatment period of the groups lasted three months. The patients received treatment three times a week, totaling 20 sessions per user, both for the electrostimulation protocol and for the kinesiotherapy protocol.

As data collection instrument, an individualized physical therapy assessment was performed, consisting of anamnesis and application of the King's Health Questionnaire (KHQ). Complete anamnesis includes aspects referring to the onset of symptoms, duration, severity, parity, constipation, and associated conditions[8].

To assess the quality of life (QoL) of the affected individual, the KHQ was applied before and after the development of the physiotherapeutic treatments. This questionnaire encompasses both objective and subjective aspects of the disease in order to examine the impact of UI on the women's QoL[9]. It is made up of 30 questions arranged into nine domains: health perception (D1), impact of UI (D2), limitations to task performance (D3), physical limitations (D4), social limitations (D5), personal relationship (D6), emotions (D7), sleep/energy (D8) and severity (D9). The answers are given numeric values summed and assessed by domains, on a scale of 0 to 100, where 0 = no/does not apply; 1 = a little/sometimes; 2 = more or less/several times; 3 = frequently/always. The higher the score the worse the quality of life[9, 10].

Pelvic floor musculature strength was assessed using a digital perineometer (manufacturer Kroman - TIU KG 40, São Paulo, SP). This procedure evaluated the effectiveness of kinesiotherapy and electrostimulation. On the occasions, the patients were instructed to contract the perineal region as hard as they could five times to record the maximum value on the Sauers scale. The scale classifies perineal strength as follows: from 0 to 10 Sauers - bad; 11 to 25 Sauers - regular; 26 to 40 Sauers - normal; 41 to 60 Sauers - good; 61 to 80 Sauers - excellent; 81 to 100 Sauers - extraordinary.

The pad test is a simple and objective method capable of assessing urine leakage and monitoring the effects of the treatment[11]. After ingestion of 500 ml (sodium-free liquid) in 15 minutes, exercises that facilitate urine loss in incontinent individuals were performed, such as[12] walking, going up and down stairs, getting up from a sitting position, coughing hard, running, squatting and washing hands in running water. The pad was weighed before and after the pad test routine to ascertain the oscillation and classify the UI into levels: 0 – completely dry; 1 – slight loss; 2 – moderate loss; 3 – severe loss[13].

The kinesiotherapy protocol is composed of a series of six exercises: two specifically for the abdominal musculature, two specifically for the pelvic floor and two associating contractions of the pelvic floor, and adductor and gluteal musculature. In each session, three repetitions of the same series of exercises were done, with participants holding the voluntary contraction of the pelvic floor for six seconds and repeating each exercise 10 times[14].

The electrostimulation protocol included the use of a Quark low-frequency functional electrical stimulation (FES) device. Isolated isometric contraction was carried out by applying the current with four channels attached to the carbon and gel electrodes between the patient's skin and the electrodes. The electrodes were taped on the coccygeal region. The following parameters were employed: pulse duration of 100 US μs (pulse trains), frequency of 50 Hz, contraction time of 2s and rest time of 1s, and duration of 20 minutes per session. During the period of electrostimulated contraction the patients were instructed to perform voluntary simultaneous contractions in the musculature of the perineal region.

It is worth mentioning that the participants were instructed to do the exercises at home in both types of treatment. They were also instructed to perform the exercises (control of urination and perineal strengthening) three times a day, with 20 contractions each time, totaling 60 contractions per day.

Since there was no withdrawal from participation throughout the research, at the end of the physiotherapy sessions the 36 individuals underwent a reassessment, in which the initial tests – KHQ, digital perineometer, pad test – were reapplied to

allow a comparison between the treatments provided to both groups of women before and after the trial..

RESULTS

Of the 36 women in the study, 41.6% (n=15) were older than 60, 11.1% (n=4) were tobacco smokers and 19.4% (n=7) had diabetes mellitus. As for parity, 77.7% (n=28) had children via vaginal delivery, 75% (n=27) reported suffering constipation symptoms, and 72% (n=26) said they used to drink more than 2 liters of water every day. When asked about menopause, 25% (n=9) reported not being menopausal yet, 27.7% (n=10) were menopausal and 47.2% (n=17) were postmenopausal.

Chart 1 displays the pad test results with regard to electrostimulation and kinesiotherapy. There was significant improvement with the proposed electrotherapy, since two of the volunteers went from UI level 1 to level 0, that is, from "slight loss" to "completely dry". Similar results were observed with kinesiotherapy, which showed significant improvement, as two women went from level 1 and level 2 to level 0 of incontinence.

Chart 1: Pad test results before and after treatment with electrotherapy and kinesiotherapy (n=36).

Groups / Pad test	Electrotherapy		Kinesiotherapy	
	Before	**After**	**Before**	**After**
Level 0	14	16	15	17
Level 1	3	1	2	1
Level 2	2	1	1	0
Level 3	0	0	0	0

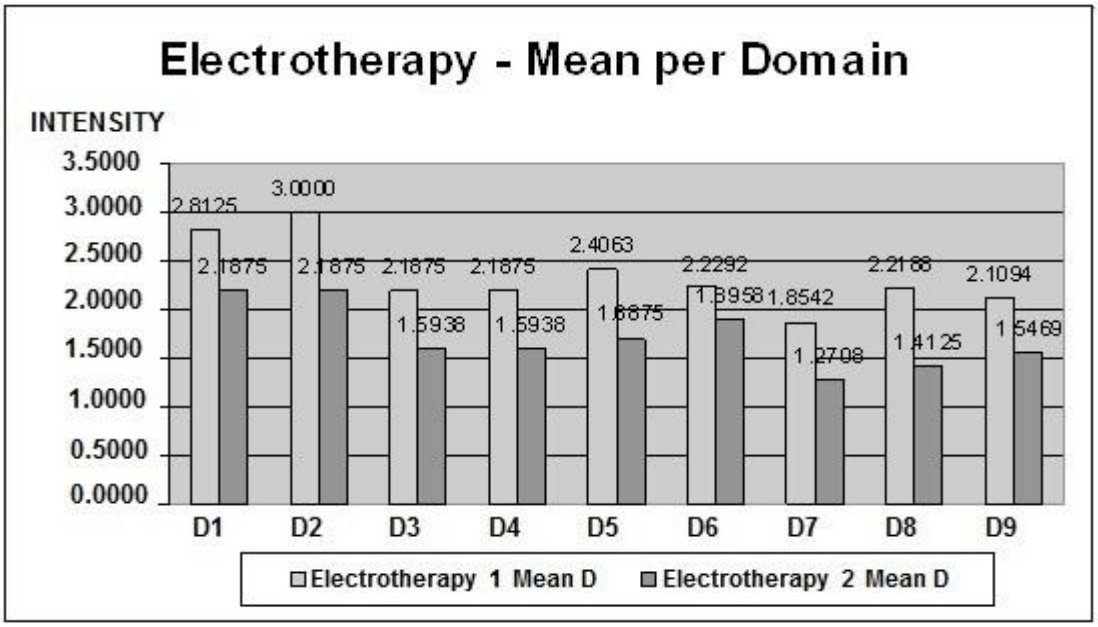
Increase in contraction strength can be observed in Chart 2, which shows the contraction strength of the perineal musculature using the digital perineometer in electrostimulation and kinesiotherapy. In the electrotherapy group, perineal contraction evolved significantly, as four (50%) of the participants who had been classified with bad and regular strength changed to normal, good and excellent, and two (12.5%) of all the study participants moved to the last two classifications. The increase in perineal contraction strength in the kinesiotherapy group evolved significantly as well, since five (35.3%) of the participants in this therapy who were classified with bad and regular muscle contraction progressed to normal, good, and, in this case, eight (50%) evolved to excellent classification.

Chart 2: Digital perineometer (TIU) results before and after treatment with electrotherapy and kinesiotherapy (n=36).

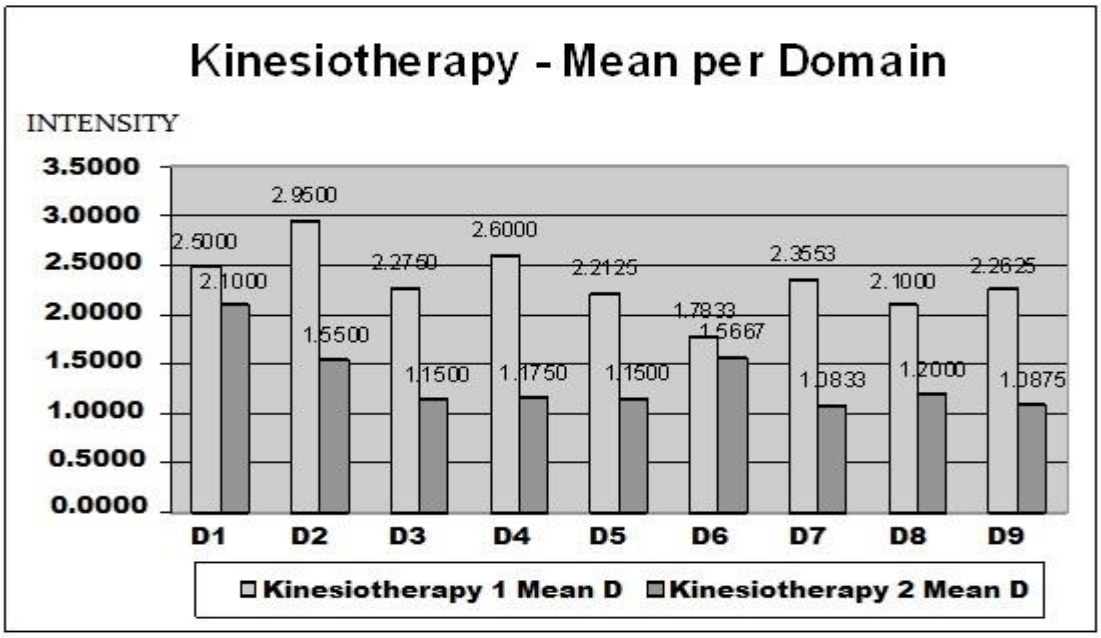
Groups / Perineometer (TIU)	Electrotherapy		Kinesiotherapy	
	Before	**After**	**Before**	**After**
Bad	2	0	8	0
Regular	6	4	7	2
Normal	7	2	3	3
Good	3	9	0	4
Excellent	0	3	0	9
Total	18	18	18	18

Graphs 1 and 2 display the results achieved after the intervention of the proposed treatments, measured by the KHQ, which point to an improvement in quality of life in all domains. In kinesiotherapy (Graph 2), the total difference between the initial and final means was 8.9761, while in electrotherapy (Graph 1) the difference was 5.6292, a fact that proves that kinesiotherapy had greater positive impact on QoL compared to electrotherapy.

Graph 1. Electrostimulation results with respect to KHQ data (n=18).



Graph 2. Kinesiotherapy results with respect to KHQ data (n=18).



DISCUSSION

The study found improvements in the muscle contraction strength verified by the digital perineometer in the electrotherapy and kinesiotherapy groups, a result that is consistent with other studies[15].

A study with a group of thirty women aged 65 years old on average, who performed 12 sessions of kinesiotherapy, showed significant improvement in urinary loss, pelvic floor muscle function and pressure[16].

A study involving kinesiotherapy, functional muscle training and Perina® biofeedback showed an improvement of 80% to 90% in consciousness and control of contraction as well as information on satisfaction and prescription of the treatment in 100%

of the patients, evidencing that physiotherapy is effective in UI treatment, reducing the loss, improving the consciousness, control and strength of the pelvic floor and, consequently, improving the quality of life of these patients, who then feel more confident and secure[17]. These data corroborate our findings, since 50% of the participants who had bad and regular strength changed to normal, good, excellent or extraordinary.

In a study conducted with 82 women with different types of UI, it was observed that, after the intervention, 88.9% of the patients reported continence and satisfaction with the treatment as a result of increased perineal muscle strength and decreased UI after the treatment, which was also identified in this study, as 100% of the women had their pelvic muscle strength and tonus improved[15].

A study comprehending 48 women aged 35-78 years old, who underwent transvaginal electrostimulation and kinesiotherapy, found that they had a positive response to physiotherapeutic treatment, showing increased pelvic floor muscle function after treatment[8].

In a different study with 10 women who were subjected to eight physiotherapy sessions lasting 40 minutes through kinesiotherapy, functional muscle training and Perina® biofeedback, there was a significant increase in the biofeedback value compared to the initial mean, reducing the loss and improving the consciousness, control and strength of the pelvic floor[17].

The present study verified that kinesiotherapy was effective in improving the contraction of the pelvic floor muscles in women with UI, with no difference between the electrotherapy group associated with kinesiotherapy in relation to the kinesiotherapy group exclusively. Because there was no comparison between kinesiotherapy and electrotherapy dissociated, it was not possible to determine which of the two therapies have better results, which is a limitation of this study.

This test evidenced, however, that the kinesiotherapy group had a better response than that of the electrostimulation group, though to a small extent. During the interactions, it was also observed that the women in the kinesiotherapy group were more excited about the treatment because they worked as a group as they exercised, which made it possible to share their worries about the disease.

Considering the neuromuscular etiology of UI, several treatments have been proposed in order to reestablish muscle and nerve function, with electrostimulation being one of the first options in traditional treatment[18]. The frequency of the stimulus in said treatment is a vital factor for its success, and researchers of this subject have evidenced high frequencies, around 50 and 65Hz[19], that is, similar to that used in this investigation. A similar study reported positive effects with the adoption of electrostimulation at a frequency of 65 Hz, pulse duration of 500 μs and intensity according to the patient's tolerance level, perineal contraction time of four seconds and rest time of eight seconds. The protocol lasted 20 minutes, twice a week, and totaled 16 electrostimulation sessions with active and assisted contraction[20].

Although electrostimulation proved to be efficient in perineal strengthening, as stated in the abovementioned studies, this research reveals kinesiotherapy as the most effective therapy. In addition, the kinesiotherapy protocol has advantages, such as the possibility of being customized for development at home or in groups, optimizing the patient's time. Moreover, it involves low costs and exempts the use of a clinic with specific equipment. These aspects are important, especially considering the shortage of professionals, equipment and structure in Brazilian health units.

The King's Health Questionnaire also consolidates the assumption that kinesiotherapy is the best option compared to electrotherapy, since the patients in that therapy had better QoL rates after the treatment, reporting that they felt more secure without the need to use hygienic pads, could resume activities in public spaces, had greater urinary control, were less concerned with occasional incontinence episodes, executed daily activities with more confidence and had their self-esteem improved. These data corroborate the findings of a study[15] that showed that after the intervention, except for health perception, there was a considerable improvement in all domains of QoL, as well as in the impact of UI on the participants' daily and physical activities.

CONCLUSION

Electrotherapy and kinesiotherapy expressed positive results in UI treatment, but kinesiotherapy proved to be a more viable therapeutic option, attested by the results of the pad test and the KHQ, which showed better responses with kinesiotherapy.

In addition to the effective reestablishment of

urinary continence, kinesiotherapy presented advantages for being performed in a group, promoting the exchange of experiences between the women and optimizing the work time of the physiotherapist. Besides, it allows the continuity of the treatment with exercises at home, an activity widely recommended due to its proven health benefits, low costs, autonomy and empowerment of the patient.

CINESIOTERAPIA E ELETROESTIMULAÇÃO NA INCONTINÊNCIA URINÁRIA FEMININA

RESUMO

A incontinência urinária é definida como qualquer perda urinária involuntária e constitui um problema social e higiênico. O objetivo do estudo foi analisar a eficácia de tratamento fisioterapêutico na reeducação da musculatura do assoalho pélvico de mulheres com incontinência urinária por meio da cinesioterapia versus eletroestimulação. Trata-se de estudo quase experimental realizado na clínica FisioUNISC entre outubro de 2007 e maio de 2008. O estudo avaliou a força de contração da musculatura perineal em 36 mulheres por intermédio do perineômetro digital, do teste do absorvente e do questionário de qualidade de vida - King's Health Questionnaire (KHQ). A terapêutica foi constituída de dois grupos distintos: o primeiro realizava a cinesioterapia; o segundo, a eletroestimulação. Cada grupo concretizou 20 sessões de tratamento, realizado três vezes por semana. Mediante o teste do absorvente, constatou-se a redução na perda de urina e o consecutivo progresso da força de contração vaginal nos dois grupos investigados, com a cinesioterapia exprimindo melhor resultado. O KHQ evidenciou resultados similares, com melhora na pontuação para os dois grupos, destacando maior pontuação no grupo da cinesioterapia. Os resultados mostraram melhora do quadro de incontinência urinária com os dois tratamentos, contudo a cinesioterapia se mostrou a opção mais efetiva.

Palavras-chave: Incontinência urinária. Qualidade de vida. Terapia por estimulação elétrica. Terapia por exercício.

CINESITERAPIA Y ELECTROESTIMULACIÓN EN LA INCONTINENCIA URINARIA FEMENINA

RESUMEN

La incontinencia urinaria es definida como cualquier pérdida urinaria involuntaria y constituye un problema social e higiénico. El objetivo del estudio fue analizar la eficacia del tratamiento fisioterapéutico en la reeducación de la musculatura del suelo pélvico de mujeres con incontinencia urinaria por medio de la cinesiterapia versus electroestimulación. Se trata de un estudio casi experimental realizado en la clínica FisioUNISC entre octubre de 2007 y mayo de 2008. El estudio evaluó la fuerza de contracción de la musculatura perineal en 36 mujeres por intermedio del perineómetro digital, del test de la compresa y del cuestionario de calidad de vida - *King's Health Questionnaire* (KHQ). La terapéutica fue constituida por dos grupos distintos: el primero realizaba la cinesiterapia; el segundo, la electroestimulación. Cada grupo llevó a cabo 20 sesiones de tratamiento, realizado tres veces por semana. Mediante el test de la compresa, se constató la reducción en la pérdida de orina y el consecutivo progreso de la fuerza de contracción vaginal en los dos grupos investigados, manifestando con la cinesiterapia mejor resultado. El KHQ evidenció resultados semejantes, con la mejora en la puntuación para los dos grupos, destacando mayor puntuación en el grupo de la cinesiterapia. Los resultados mostraron mejora del cuadro de incontinencia urinaria con los dos tratamientos, no obstante la cinesiterapia se mostró la opción más efectiva.

Palabras clave: Incontinencia urinaria. Calidad de vida. Terapia por estimulación eléctrica. Terapia por ejercicio.

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