



Case Study

Effects of physiotherapy treatment for urinary incontinence in patient with multiple sclerosis

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Abstract. [Purpose] The aim of the study was to evaluate the benefits of physical therapy for urinary incontinence in patients with multiple sclerosis and to verify the impact of urinary incontinence on the patient's quality of life. [Subject and Methods] A case study of a 55-year-old female patient diagnosed with multiple sclerosis and mixed urinary incontinence was conducted. Physical therapy sessions were conducted once a week, in total 15 sessions, making use of targeted functional electrical vaginal stimulation, along with active exercises for the pelvic floor muscles and electrical stimulation of the posterior tibial nerve, behavioral rehabilitation and exercise at home. [Results] After 15 physical therapy sessions, a patient diagnosed with multiple sclerosis and mixed urinary incontinence showed continued satisfactory results after five months. She showed better quality of life, higher strength of pelvic floor muscle and reduced urinary frequency without nocturia and enuresis. [Conclusion] The physical therapy protocol in this patient with multiple sclerosis and mixed urinary incontinence showed satisfactory results reducing urinary incontinence symptomatology and improving the patient's quality of life.

Key words: Multiple sclerosis, Physical therapy modalities, Urinary incontinence

(This article was submitted Jun. 17, 2016, and was accepted Aug. 11, 2016)

INTRODUCTION

Multiple sclerosis (MS) was formally identified in 1868 by Jean Martin Charcot, and initially described as multiple sclerosis, referring to dispersed circumscribed areas which he found in the Central Nervous System (CNS) in autopsies of patients who had the disease¹. It is defined as a chronic and progressive disease that affects young adults below 40 years of age and it leads to the appearance of various neurological symptoms, often causing disabilities². MS is characterized by injuries (plaques)—distinct areas of myelin loss distributed by CNS, mainly in white matter. Such demyelinating plaques are accompanied by destruction of oligodendroglia and inflammation (or accumulation of white blood cells and fluid around the blood vessels within the CNS. Most of the cell bodies and axons are spared; however, axons may be destroyed when fibrous glucose (scarring) happens. Due to the destruction of myelin, neurotransmission is impaired³.

The injuries are demyelinated plaques, which are observed diffusely throughout the brain and spinal cord and have a grayish-pink color with well-marked contours, contrasting with the color of the white matter. The temporal feature can also be observed by injuries in different stages of evolution. This observation of injuries in different stages of evolution might result in a chronic disease⁴.

Due to the wide variability of anatomical locations and temporal sequence of injuries in patients with MS, the clinical manifestations of the disease vary from one individual to another. The incidence of initial symptoms in descending order of frequency is (1) motor weakness, (2) retrobulbar neuritis, (3) paresthesia (4) unsteady gait, (5) double vision (6) vertigo/

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vomiting, and (7) micturition disorders³).

UI is related to fatigue and uncoordinated muscle recruitment characteristic of MS, which have influence on the individual's quality of life, according to the World Health Organization (WHO), the Quality of Life (QOL) is defined as "the individual's perception of their position in life and in the cultural context in which they live in relation to their goals, expectations, concerns and desires⁵).

The most common urinary disorder present in patients with MS is urinary incontinence (UI), which is little mentioned in the literature, and often harms the social life of the individual with MS, being a limiting factor for trips and uncomfortable for daily activities⁶).

UI is defined as involuntary loss of urine, being a social or hygienic problem and it has been described as a social or hygienic problem in several studies⁶). There are basically three types of UI: Urgency Urinary Incontinence (UUI), Stress Urinary Incontinence (SUI) and Mixed Urinary Incontinence (MUI), which also includes SUI and UUI⁷).

Kinesiotherapy for the strengthening of the pelvic floor muscles and intravaginal and/or surface electrical stimulation has shown impressive results for the improvement of UI symptoms in up to 85% of the cases. One of the main goals of physical therapy is to strengthen the pelvic floor muscles, because the improvement of strength and function of these muscles favors a conscious and effective contraction in times of increased intra-abdominal pressure, thus preventing urinary losses. Moreover, it helps to improve the tone, urethral pressures transmissions, reinforcing the urinary continence mechanism⁸).

In MS, the most common and reported by the patients is the MUI that is related to the lack of control of the muscles involved in continence and detrusor hyperactivity⁹). In this context, the aim of the study was to evaluate the benefits of physical therapy at IU in patients with MS and to verify the impact of urinary incontinence on the QOL of this patient.

SUBJECT AND METHODS

A case study of a 55-year-old female patient diagnosed with multiple sclerosis and mixed urinary incontinence was conducted. Physical therapy sessions were conducted once a week, in total 15 sessions (being the first and the last reserved for evaluation), making use of targeted functional electrical vaginal stimulation, along with active exercises for the pelvic floor muscles and electrical stimulation of the posterior tibial nerve, and behavioral rehabilitation and exercise at home. After the acceptance of the Informed Consent Agreement, the patient underwent anamnesis and answered the Quality of Life Questionnaire for Urinary Incontinence, International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), the Overactive Bladder Assessment Questionnaire (OAB-V8), and filled in the Voiding Diary. The contractility of the pelvic floor muscles by vaginal examination, and urine loss by pad test were evaluated. Functional Evaluation of the Pelvic Floor (AFA) complemented by Perfect Test was performed. The revaluations were made after treatment and follow-up after five months.

The functional evaluation of the pelvic floor was performed with the patient in the supine, in gynecological position (abducted hips, knees bent and feet supported), the therapist was wearing examination gloves (brand Embramac) on both hands throughout the session. The sensibility test was performed giving medium intensity stimuli with the little finger of one hand, following the sequence: inner region of thighs, labia and small labia, clitoris and anus. Following the evaluation of the sensitivity of outer regions, with the patient in the same position, the therapist wearing gloves and lubricant gel (brand Maquel), pulled the small labia away with one of her hands and, with the other, first introduced the second finger and then the third finger until the middle third of the vagina (about 3–4 cm) into the vaginal canal, thus evaluating the vaginal walls and the integrity of the pelvic floor muscles (scars, symmetry, atrophic areas or lacerations).

The function of the pelvic floor muscles was evaluated for muscle contraction and relaxation and voluntary cooperation of the patient according to the modified Oxford scale¹⁰).

In order to measure the loss of urine, the pad test was performed as recommended by International Continence Society (ICS)¹¹), using the sanitary napkin of brand TENA, regular size, previously weighed in the scale in kilograms. The patient was asked to empty the bladder before putting on the sanitary napkin. Then, the patient orally ingested 500 ml of water in a maximum time of 15 minutes, she was allowed to rest for 30 minutes.

Throughout the treatment, the directed vaginal electrical stimulation sessions were performed using the Dualpex 961 device and vaginal electrode containing four metal rings both of brand Quark – Medical Products. The electrostimulation sessions were performed in a private doctor's office in which there was a portable stretcher (1.80 m length, 80 cm width) and an armchair.

The first four sessions were held with the patient in the supine position (Table 1). The fifth and the seventh sessions were performed with the patient in the supine position (seated). Since the first session, she was instructed to do kinesiotherapy for the muscles of the pelvic floor at home, twice a day, three sets of 10 slow contractions (five seconds of contraction with 10 seconds of rest) and three sets of 15 quick contractions (one second of contraction and one second of rest); and from the sixth session on, the patient was instructed to do the exercises using tampons twice (10 contractions) per week as follows: Insert the tampon into the vaginal canal, pull the string of it and simultaneously perform muscle contraction without letting the tampon come out of the vaginal canal. From the eighth session on, electrostimulation was performed in the standing position, simulating everyday activities such as walking, squatting and going up and down stairs.

Electrical stimulation has been used to recruit and strengthen type I fibers (slow and resistance) through contracting and

Table 1. Description of the parameters used in the sessions: 2nd to 4th (supine position)

Parameters	PW (μm)	Frequency (Hz)	Rise time	Descendent time	ON time	OFF time	Attendance
Type I fibers	500	35	2'	2'	5'	10'	10'
Type II fibers	500	35	1'	1'	1'	1'	3 sets 10 contractions with 1' rest between
Posterior tibial	200	8	NA	NA	NA	NA	30'

PW: pulse width, μm : micrometer, Hz: hertz, NA: not applicable

Table 2. Description of the parameters used in the sessions: 5th to 14th (High decubitus and orthostatic associated with stress maneuvers)

Parameters	PW (μm)	Frequency (Hz)	Rise time	Descendent time	ON time	OFF time	Attendance
Type I fibers	700	50	2'	2'	5'	10'	10'
Type II fibers	700	50	1'	1'	1'	1'	3 sets 10 contractions with 1' rest between
Posterior tibial	200	8	NA	NA	NA	NA	30'

PW: pulse width, μm : micrometer, Hz: hertz, NA: not applicable

Table 3. Main results from the 1st, 15th and five months follow-up

	1st session	15th session	Five months of follow-up
International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF)	19	3	3
Oxford modified scale (P: power)	1	2	2
PERFECT			
E: endurance	0	8	8
R: repetition	0	2	2
F: fast	2	2	2
Bladder Overactive Assessment Questionnaire (OAB - V8)	40	10	10

All values are presented in each specific score

holding; and type II fibers (fast, strength and speed) quickly contracting and relaxing the pelvic floor muscles, according to Tables 1 and 2 of treatment through electrical stimulation.

The patient consent to participate of this study and authorize the publication of this data for scientific purpose. Her identity will remain confidential.

RESULTS

After 15 physical therapy sessions, a patient diagnosed with multiple sclerosis and mixed urinary incontinence showed continued satisfactory results after five months. Regarding the outcome of the ICIQ-SF questionnaire, the patient reduced the total score from 19 to 3 points after treatment and maintained this same total score after five months' follow-up, which means a reduction in episodes of urinary loss and in the impact of urinary loss in the patient's daily life (Table 3).

Likewise, physical therapy has proved to be beneficial to patients with MS and IUM for increasing muscular strength of the pelvic floor, which according to Oxford modified scale, she had grade 1 muscle strength and it evolved into 2 at the time of discharge. This strength has been maintained, and five months later in reevaluation, the patient still had grade 2 muscle strengths (Table 3).

However, when a separate analysis to evaluate P (power), E (endurance), R (repetitions) and F (fast) was performed, it showed different results. The result of muscle contractility of the pelvic floor and showed significant improvement in muscle strength component for repetition (R) and endurance (E), even though the fast-twitch fibers (F) showed no change when comparing the three periods assessed (1st session, 15th session and five months of follow-up) (Table 3).

According to the results obtained from the Bladder Overactive Assessment Questionnaire (OAB-V8), the patient showed

improvement in the impact caused by the episodes of urgency, urge incontinence and nocturia in her daily life. In the first evaluation her questionnaire score was 40 points and shortly after treatment that score dropped to 10 points, and remaining 10 points after five months in reevaluation (Table 3).

The Pad test was inconclusive because the patient could not do it until the end; according to Voiding Diary it was observed on the first day a daytime frequency of 11, 2 episodes of nocturia and enuresis, and in the Voiding Diary and after treatment there was daytime frequency of 6 episodes without nocturia and enuresis.

DISCUSSION

Urinary incontinence is considered a distressing condition, affecting life in the social, psychological, occupational, domestic, physical and sexual aspects of women of all ages. The pathophysiology may vary according to each case, requiring different therapeutic approaches according to the mechanism of loss urine¹².

McClurg et al.¹³, in their randomized study, reveals that patients with MS at some point throughout the course of the disease, will present lower urinary tract dysfunction; complements saying that the most common dysfunction among these patients is the detrusor hyperactivity, which is often associated with detrusor sphincter dyssynergia. In our case study, the patient had MUI from the first MS attack, which occurred in 2007.

Jiang et al.¹² in their study, reported that the pelvic floor and abdominal muscles, in individuals without any diseases, work together, and the abdominal muscles might activate the perineal muscles and vice versa; It also describes that the elevation of the pressure increase of the pelvic floor precedes the increase in intra-abdominal pressure. This suggests that the perineal muscles are not activated by increased intra-abdominal pressure but by activation of central nervous mechanisms. Thus, it works with perineal muscles, strengthens the pelvic floor in order to prevent and/or reduce the SUI.

Vermandel et al.¹⁴ report that electrical stimulation along with verbal instruction helps patients who cannot perform the voluntary contraction of the muscles to gain awareness regarding the muscles that should be contracted.

To Balken et al.¹⁵, 30–50% of women have difficulty performing the contraction of the pelvic floor, many of which are unable to perform the contraction spontaneously also says that verbal instruction will help to get awareness of the muscles and perform contraction, in accordance with the study of Matheus et al.¹⁶, which states that voluntary movements of the repeated contraction of the pelvic floor provide increased strength of those muscles.

Fischer-Sgrott et al.¹⁷ reports that some physical therapy methods for the treatment of urinary incontinence which employ electrical stimulation consist of intermittent neuromodulation and may be intraanal, intravaginal, perineal, transcutaneous, supra-pubic or sacral nerve and posterior tibial, giving satisfactory results in improved UI.

It is believed that electrical stimulation of the tibial inhibits bladder activity by depolarization of sacral and lumbar somatic afferent fibers, resulting from motor and sensory stimulation in the area of the posterior tibial nerve responses. Centrally, this nerve enters the sacral spine in the same area where the nerve projections to the bladder are located. It is on these areas that the therapeutic effect of electrical stimulation acts through the neuromodulation of the bladder¹⁵.

Rovner et al.¹⁸, carried out a work on the assessment and treatment of overactive bladder concluding that the results with behavioral therapy are very good, registering a 57% reduction in urge incontinence episodes and a 54% reduction in the amount of urine loss in the elderly. The reduction in incontinence episodes was similar in patients with overactive bladder and incontinence, reduction in the amount of loss was higher in patients with overactive bladder than those with stress urinary incontinence. In this same work, it is described that after reviewing several studies, he reached the conclusion that the behavioral therapy for BH resulted in 50–75% reduction of the symptoms in 50% of patients studied.

Peters et al.¹⁹ reports that electrostimulation aims at restoring muscle and nerve function of the pelvic floor. The strengthening the pelvic floor muscles is based on repeated voluntary movements, providing an increase in muscle strength, which can be done by electrical stimulation with the use of cutaneous and/or endo-vaginal devices. Electrodes placed on the perineum percutaneously, among others, promote an increase in sphincter resistance and detrusor reduction¹⁷. Ratifying the resources used in this study.

In this study, the results showed an improvement in mixed urinary incontinence, because in the reevaluation after treatment and 5 months after the end of treatment, the patient scored 3 points in the ICIQ-SF questionnaire, in which she had scored 19 points before the treatment, the pelvic floor muscle strength after the reevaluation had increased to grade 2 (initially, it was grade 1) it is also possible to notice the evolution of the patient, as before the treatment, the patient had scored 40 points in the Overactive Bladder Questionnaire, and at the time of discharge she scored 10 points, which remained the same five months after the discharge. It is noteworthy that during the physical therapy, the patient had a second MS outbreak, and after two months after the end of the treatment she had the third outbreak. It was observed that, even with outbreaks, the patient's urinary symptoms did not get worse.

In conclusion, physical therapy treatment for Mixed Urinary Incontinence, in this case study, showed satisfactory results reducing UI symptomatology and improving the patient's quality of life.

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