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

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/
sessions were performed in a private doctor's office in which there was a portable stretcher (1.80 m length, 80 cm width) and
was asked to empty the bladder before putting on the sanitary napkin. Then, the patient orally ingested 500 ml of water in an armchair.

After the acceptance of the Informed Consent Agreement, the patient underwent anamnesis and answered the Quality of Life
device and vaginal electrode containing four metal rings both of brand Quark – Medical Products. The electrostimulation
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 mechanism.

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 hyperactivity. 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
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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 consented to participate in 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 month’s 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 urine\textsuperscript{12}.

McClurg et al.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{16}, which states that voluntary movements of the repeated contraction of the pelvic floor provide increased strength of those muscles.

Fischer-Sgrott et al.\textsuperscript{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 bladder\textsuperscript{15}.

Rovner et al.\textsuperscript{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.\textsuperscript{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 reduction\textsuperscript{17}. 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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