

Urodynamic alterations after pelvic floor exercises for treatment of stress urinary incontinence in women

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Summary

The following study improves the effectiveness of pelvic floor exercise in women with stress urinary incontinence. A group of 27 women with stress urinary incontinence performed specific pelvic floor exercises twice a week for 45 minutes under a therapist's supervision for a period of 12 weeks.

This group had urodynamic and urethral pressure profile studies and filled in a daily diary. The patients self-evaluated their symptoms.

After the therapy, the urodynamic and urethral pressure profile studies were repeated and the results were: 66.7% patients were self-evaluated as cured; 14.8% improved and 18.5% unchanged. The urodynamic results showed that 48.2% of the patients did not have urinary loss, however, 51.8% of the patients that had a loss showed an increase in vesicle volume, and only 7.3% remained unchanged.

The results show that pelvic floor exercises are an effective and low cost treatment for stress urinary incontinence rehabilitation.

Key words: Exercises; Daily diary; Pelvic floor urethral pressure; Urodynamics.

Introduction

Urinary incontinence is an affection that can restrict social, familiar, professional and sexual activities, diminishing the quality of life, generating social isolation and emotional stress [1].

Among incontinence forms, stress urinary incontinence is the most frequent [2]. It is defined as urinary loss through the external urethral ostium when increased intravesicle pressure exceeds the urethral closure peak pressure in absence of detrusor muscle activity, thus producing a symptom, a signal and a condition [3].

The incidence and prevalence of urinary stress incontinence is variable according to age group investigations, wherein the prevalence, severity and incurable cases increase with age [4, 5].

Almost 10% of the women who go to gynecology in Brazil have urinary loss as the main complaint [6, 7], and apart from several factors that can determine urinary incontinence, we can distinguish extra-abdominal topography of the vesicle neck, short urethra function, urethral intrinsic mechanism injury, pudendal nerve injuries, hypoestrogenism and fascia and muscle injuries of the pelvic floor [8]. One of the most important factors for the genesis of stress urinary incontinence is the muscle tone of the pelvic floor [9].

Pelvic floor exercises were first described by Kegel in 1948 [10] and acquired relevance in clinical treatment for urinary incontinence in the 1980s [11]. Pelvic floor strengthening is based on the principle that the benefits from muscle strength are only gained by employment of

a great number of motor units in small frequencies of exercises and gradually longer contractions. Few repetitions should be performed per day, with a gradual increase of strength intensity and contraction time, trying to isolate great muscle masses, such as the gluteus, abdominal rectus and adductors in order not to mask the real pelvic floor contraction [12, 13].

The results are conflicting in relation to urinary incontinence therapy for the strengthening of the pelvic floor. Such variation is attributable to several parameters such as evaluation, time and type of employed exercises [14].

Nevertheless, we decided to evaluate the efficacy of pelvic floor exercises in the treatment of stress urinary incontinence in women, taking into account the daily diary and urodynamic parameters.

Cases and Method

Twenty-seven women with stress urinary incontinence were selected at the Urogynecology and Vaginal Surgery Sector (gynecology subject matter), Universidade Federal de São Paulo, Escola Paulista de Medicina (UNIFESP-EPM), São Paulo, Brazil.

All patients had been evaluated in relation to the trophism of the genital tissue, degree of vaginal wall and uterus prolapse, existence of perineal rupture and in which position the urinary loss occurred in relation to the required stress.

Patient age ranged from 29 to 75 years old (average 48); some were in the menopause period and 74% were caucasian.

Parity varied from zero to nine, with an average of 3.5 child-births per patient, wherein 65.2% had been vaginal deliveries. Included were patients with stress urinary incontinence by clinical diagnosis, improved by urodynamic study, without previous treatment, perineal rupture of at most second degree and mild or moderate prolapses.

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Patients with detrusor hyperactivity, sphincter damage, neurogenic bladder or other types of degenerative or chronic diseases that affect the muscles and nervous tissue as well as patients in hormonal therapy were not included.

The urethral pressure profile study was performed in the gynecological position with a full bladder. Thus, functional length and peak pressure of urethral closure were determined.

After the urodynamic study, patients with urinary loss during the cystometry were selected, in absence of detrusor hyperactivity, peak pressure above 20 cm H₂O and vesicle pressure above 60 cm H₂O (leak point).

Such patients were individually evaluated, wherein beyond the clinical and gynecological data, the pelvic floor muscle strengthening (0 to 5 according to the Oxford scale) [15, 16]. In addition, they were taught how to appropriately contract the pelvic floor muscles.

The subsequent sessions were in groups twice a week for 45 minutes of specific exercises for the pelvic floor, under a therapist's supervision and direct verbal commands for a period of 12 weeks. A series of exercises in a successive positions were performed: supine, seated and standing, with a ball between the legs to isolate the adductor and gluteus muscles, and a contraction-resting temporal ratio of 1:1.

The patients filled in the number of urinations and loss of urine in a daily diary eight days before the beginning, on the 90th day, and 30 days after the end of treatment. A new urodynamic study was performed after the physiotherapy sessions ended. The patients self-evaluated the cure as improvement or unchanged.

In the statistical analysis, we used the paired t-test in order to detect possible differences between the average values found in urodynamic parameters.

In order to verify the standard behavior of "urinary loss" in the daily diary over 128 days, we used a variance technique with temporal series analysis based on the Walsh-Fourier technique. In this analysis the level of significance was predetermined as 0.01.

The rest of the tests were predetermined with the value of 0.05 or 5% (minor alpha or equal to 0.05) for rejection index of hypothesis of nullity, designating the significant values with an asterisk.

The present study was approved by the Medical Ethics Commission of the Universidade Federal de São Paulo- Escola Paulista de Medicina. All patients were informed about the research and signed an informed consent to participate.

Results

After the therapy, 66.7% of the patients considered themselves cured; 14.8% improved and 18.4% had the same clinical condition as prior to the treatment.

At cystometry, a significant increase in vesicle capacity at the first desire to urinate, peak cystometric capacity and vesicle volume at the moment of first urinary loss were noticed. It was observed that 48.2% of the patients did not have urinary loss, however 51.8% of the patients that had loss showed increased vesicle volume (50%), and only 7.3% remained unchanged.

Using a variance technique in temporal series analysis based on the Walsh-Fourier technique, the standard of "urinary loss" routine was studied the daily diary for 128 days. Patients presented a gradual decrease in the number of urine losses beginning on the 32nd day of treatment (Figure 1).

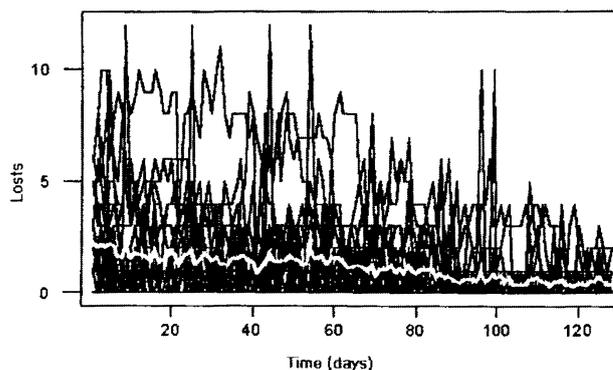


Figure 1. — Graphic over positions shows the progressive decrease in the number of the urine losses during 128 days.

Discussion

The great incidence of stress urinary incontinence associated with a high cost for its preventive or therapeutic treatment generates an annual expense of approximately 16 billion dollars in the USA [6]. Such a fact stimulated us to study this financially accessible therapeutic technique.

The prevalence and the intensity of stress urinary incontinence are increased by aging and parity. The passage of conceptus through the childbirth canal provokes distention of pelvic floor musculature, being its main cause of injury and flaccidity, followed by postmenopausal estrogen deficiency [17, 18].

A complete and functioning pelvic floor is indispensable for the maintenance of urinary and fecal incontinence, as well as, for the support of pelvic and abdominal viscera when intra-abdominal pressure is increased [19].

Several researchers have analyzed the efficacy of clinical treatments for stress urinary incontinence by exercises of pelvic floor strengthening, however, these studies demonstrated diversity related to the training intensity and frequency and a cure rate with variation from 5 to 71% [5, 20, 21].

Ours results demonstrated that 81.5% of the patients had considered themselves as cured or improved, and only 18.5% showed an unchanged condition after the treatment.

We observed a significant reduction in the daily number of urinary losses as evaluated by the diaries. Using temporal analysis we observed the beginning of clinical improvement at the 9th week and the average patient tended to be cured about the 18th week.

The urodynamic results are concordant with the clinical evaluation performed with absence of loss in 48.15% of the patients during the cystometry after treatment. In 51.85% of the cases loss occurred, but with a significant increase in vesicle capacity at the first desire to void, peak cystometric capacity and vesicle volume in which loss occurred.

The functional length of the urethra and peak pressure of urethral closure did not show statistically significant

differences. Nonetheless, the peak pressure of urethral closure increased. In a study carried out by Wilson *et al.*, 42% of the patients treated by exercise showed an increase in peak pressure of urethral closure, justifying the efficacy of this therapy for stress urinary incontinence.

In the flowmetry, we did not observe alterations in the values of peak urinary flow, total tone of voiding or urinary volume after the treatment. A significant increase of the mean urinary flow was registered.

The exercises for the pelvic floor increase the activities of motor units, leading to hypertrophy and increase in muscle volume [19, 22, 23]. This hypertrophy fortifies the urethral closure and the reflected contractions will be faster, giving support to the maintenance of urinary incontinence.

Conclusion

Based on our clinical and urodynamic parameters, we observed that the kinetic therapy for pelvic floor strengthening as a clinical treatment for stress urinary incontinence is an effective treatment with low cost and easy applicability.

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