

## The Effect of Biofeedback Therapy on ICIQ-SF Scores and Urodynamic Parameters in Patients with Stress Urinary Incontinence

Omer Bayrak<sup>1\*</sup>, Ilker Seckiner<sup>1</sup>, Mehmet Sakip Erturhan<sup>1</sup>, Ahmet Erbagci<sup>1</sup>, Faruk Yagci<sup>1</sup>

<sup>1</sup> Department of Urology, Gaziantep University, Gaziantep, Turkey

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### ABSTRACT

**Background:** Stress Urinary Incontinence (SUI) is an increasingly common problem in women. 10% of women are usually diagnosed with urinary incontinence within the first 3 years after entering menopause. Although most of these cases are remediable, because of delays in seeking treatment, treatment goals are not always achievable.

**Objectives:** This study sought to compare the urodynamic parameters and the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) scores in patients with SUI.

**Material and Methods:** In this study, the ICIQ-SF was completed and urodynamics were tested for 40 patients with SUI. After receiving biofeedback therapy, the ICIQ-SF was completed again, and urodynamics were tested again.

**Results:** The findings showed a statistically significant improvement in the ICIQ-SF scores from before ( $9.95 \pm 4.39$ ) to after ( $18.07 \pm 2.4$ ) the biofeedback therapy. However, the analyses did not show any statistical difference between the urodynamic parameters before and after biofeedback therapy.

**Conclusions:** the results of this study indicated that the patients began improving with the help of biofeedback therapy, and their ICIQ-SF scores decreased. For these reasons, biofeedback appears to be a good alternative to surgery. Urodynamic testing is not necessary for SUI patients who plan to receive biofeedback therapy because the therapy does not appear to make any change in patients' urodynamic parameters.

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#### ► Implication for health policy/practice/research/medical education:

On patients with stress urinary incontinence, biofeedback therapy is a good alternative to surgical treatment. Patients' quality of life increases because they either no longer experience incontinence or have a decrease in the number of wet pads. Biofeedback does not make changes in urodynamic parameters, so urodynamic studies are not necessary for patients with stress urinary incontinence who plan to receive biofeedback treatment. However, if surgical treatment is planned, urodynamic studies can be useful.

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## 1. Background

In recent years, stress urinary incontinence (SUI) has become a common problem in patients of middle and older age. Urinary incontinence has been observed at a rate of 2-5% in young women who have never born children, and this rate increases to 30% in the postmenopausal

period (1-3). Another study found that, within first 3 years after menopause, urinary incontinence was present in 10% of women who had no complaints of the disease (4). Although most cases of SUI are remediable, the problem is often not addressed because some patients are too embarrassed to inform a physician about their condition and other patients assume that their incontinence is normal and will pass. Treatment options for SUI include strengthening the pelvic floor muscles with exercise, pharmacotherapy, and several surgical methods. The treatment goal is to strengthen urethral stability and

\* Corresponding author at: Omer Bayrak, University of Gaziantep, School of Medicine, Department of Urology, 27310 Gaziantep, Turkey. Tel: +90-5326428800, Fax: +90-3423603998.

E-mail: dromerbayrak@yahoo.com

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help the patient regain the functions of urethral support tissues.

Among the surgical treatments available, doctors often have a difficult time choosing the best option for their patients because of treatment methods variations. . Therefore, it is very important to observe the urethra and its support tissues anatomically to select the most appropriate and efficient treatment for a given case. The purpose of surgical treatment is to fix the position of the urethra. The purpose of rehabilitation is also to provide urethral stability by increasing the strength of the pelvic floor muscles. Surgical treatment is an effective method but has the disadvantages of a the long recovery period and an incontinence recurrence rate 10 to 40% of patients (5). Other disadvantages are the high monetary cost of surgery and an increased urge to urinate in the postoperative recovery period. Conservative treatment includes Kegel exercises, vaginal cones, electric stimulation, and biofeedback. Biofeedback and pelvic-floor-muscle exercises are often advised, especially for treatment of stress incontinence and mixed incontinence, because of they do not include any potential side effects and they are low cost. A previous study has shown that the improvement rate with these exercises methods combined with biofeedback ranges from 78 to 90% (6).

## 2. Objectives

In this study, we aimed to examine the efficiency of biofeedback treatment on patients with SUI. For this purpose, urodynamic parameters and the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) scores were compared before and after the treatment.

## 3. Materials and Methods

Confirmation from a Local Ethics Committee at Gaziantep University was obtained for this prospective study. Fifty-five patients who applied to our Urology Clinic with complaints of urinary incontinence between January and August 2009 were included in this study. Patients gave their verbal consent to participate in the study. First, urine analyses were conducted for all patients, and urinary infection was treated if presented. Then, detailed patient histories were taken. All patients had a genuine case of SUI. Age, height, body-mass index (BMI), duration of incontinence, birth number, chronic diseases, previous operations (cystocele, total abdominal hysterectomy) and the patient was taking anticholinergic treatment were examined. We excluded the patients who had mobility problems, psychological problems, stool impaction, excess urine production, restricted mobility, and reports of difficult delivery. Thirty five people were excluded with these criteria. The patients were asked to complete the ICIQ-SF forms, and their ICIQ-SF scores before the treatment were recorded. Then, patients were taken

to the urodynamic study and we performed the Valsalva leak-point-pressure test. Patients' pretreatment sensation values, bladder capacity, instability, and residual quantity were recorded urodynamically. Fifteen of 55 patients did not come to the treatment, and the study was continued with 40 patients. Five of these 15 patients did not come for treatment because of recurrent uro-genital infection, 5 of them did not accept the urodynamic examination a follow-up study, and 5 of them did not come for personal reasons (distance between the hospital and their home, work conditions, etc.).

Exercise training with biofeedback was conducted while the patient was in a sitting position by using EMGs with an MMS Solar Urodynamics Device (ADS Ltd.- Holland) and a biofeedback software program. First, patients were informed about the device, and then our responsibility and the patient's role during the achievement process was explained. A game program with bird was used for feedback. At biofeedback treatment with EMG, the patients first observed a bird flying on a nonresistance path, and at later stages of the treatment the bird was observed flying over and under the set. A total of 16 biofeedback exercises and pelvic floor muscle training was performed in all patients. Biofeedback therapy was applied to patients 20 minutes for 2 days in a week, during 8 weeks. During the treatment, contraction time was set at 10 seconds, and relaxation time set at 20 seconds. At the same time, passive pelvic floor muscle exercises were taught to patients, and patients were advised to do exercises when they were standing, sitting, talking on the phone, and watching TV. Patients reported their incontinence history after the treatment, and their ICIQ-SF scores after treatment were recorded. Then, urodynamic tests were conducted. Patients' posttreatment sensation values, bladder capacity, instability, and residual quantity were recorded urodynamically. Patients' ICIQ-SF scores and urodynamic parameters before and after treatment were compared. SPSS 11 for Windows was used to run the statistical analyses, and data were presented as arithmetic means and standard deviations. Because intragroup pretreatment and posttreatment parametric test hypotheses were covered, paired-samples tests were used. Achievement of treatment and Pearson correlation tests were used when patient specifications were correlated. A confidence interval of 95% ( $P < 0.05$ ) was used as the cutoff for statistical significance.

## 4. Results

This study included a final sample of 40 urinary-incontinent patients with complete data. The average age of the sample was 47, and their average BMI was 29.136. The average period of which patients complained of incontinence was 4.37 years (detailed patient data can be seen in *table 1*). Among these 40 patients, 4 patients had hypertension, 2 patients had disc hernias, and 2 patients had diabetes mellitus. Six patients had used anticholinergic treatment, 6 patients had gone

**Table 1.** Definitive Values of All Patients Before and After Treatment

	Before Treatment	After Treatment	P value
ICIQ-SF score	18,07 ± 2,5	9,95 ± 4,4	< 0.0001
Bladder capacity, mL	469,6 ± 163,5	498,9 ± 183,1	0.402
Detrusor instability	22	20	0.712
Sensation of bladder, mL	161,6 ± 87,1	145,8 ± 65,7	0.414
Residual urine volume, mL	194 ± 32,3	NA <sup>a</sup>	0.325

<sup>a</sup> Abbreviation: NA, Not available

through an operation because of cystocele. The ICIQ-SF scores of the 40 patients who took biofeedback treatment were compared before and after treatment. The mean pretreatment score was  $18.07 \pm 2.49$ , and the mean posttreatment score was  $9.95 \pm 4.39$ , and the improvement from before to after treatment was statistically significant. However, for 33 patients who were given urodynamic tests after treatment, no statistically significant change was observed between urodynamic parameters before and after treatment (Table 1). Pearson correlation tests evaluated the relationships among treatment, age, height, weight, number of normal births, number of cesarean births, total number of children, number of patients who had a total abdominal hysterectomy, number of patients who used anticholinergic medication, and number of patients who underwent a cystocele operation. No statistically significant differences were found between correlation tests, except for a positive correlation between the number of cesarean births and achievement of treatment (correlation coefficient 0,265). Twelve patients out of the study sample reported that they had stayed dry fully (30%), and 22 patients reported that number of wet pads had decreased. No change was observed or 6 patients (15%; 2 of these patients discontinued the treatment at seventh week).

## 5. Discussion

Urinary incontinence is a multidisciplinary event, affecting women at any age, having social side effects, and in general negatively impacting quality of life. It is high-cost social and medical problem, covering almost 2% of health charges in the United States (7). The condition affects 17 to 45% of adult women (8). The ICIQ-SF has been developed to provide a simple, brief, and robust questionnaire to assess the condition's symptoms and impacts on quality of life. Assessments of internal consistency and stability have demonstrated that the ICIQ-SF is highly reliable, providing consistent, stable, and reproducible data (9). Short questionnaires are ideal for routine administration in clinical settings, particularly when frequent assessment is required or in situations when time is limited. Our study required two assessments for each patient, and this short form was ideal for our purposes. Few studies have examined the correlations between the ICIQ-SF and urodynamic

parameters. Seckiner *et al.* examined the correlations between ICIQ-SF score and urodynamic findings in patients with urge incontinence. They found that higher maximal detrusor pressure levels were moderately correlated with higher ICIQ-SF scores. They concluded that the ICIQ-SF questionnaire may provide predictive information in cases of overactive bladders (10). Because of the high comorbidity potential of surgery and increasingly high cost, conservative treatments have continued to gain favor among physicians and patients. Conservative treatments include behavioral approaches and hormonal and nonhormonal medical treatments. Their costs and potential side effects of nonsurgical methods are low. Behavioral treatments include diet, bladder training, pelvic floor muscle exercises, and biofeedback. In a study by Capelini and her colleagues, biofeedback was applied to 14 patients with stress incontinence for 12 weeks. The participants underwent urodynamic measurements and pad tests before and after treatment. The researchers found an increase in Valsalva and incontinence point pressure, bladder capacity, and urine volume after the urodynamic treatment. For the pad tests, a decreases were observed in pad weight and incontinence episodes (11). In a 7-year longitudinal study, Dannacker and colleagues found a significant decrease in incontinence symptoms for patients who completed EMG-biofeedback pelvic floor muscle exercises. Christian *et al.* concluded that biofeedback treatment could be applied conservatively without undergoing surgical treatment (12). In a study by Dumolin and Hay-Smith, women who completed pelvic floor muscle training were more likely to report that they had better quality of life and that they were cured or had improved than women who did not complete the training. Women who completed the pelvic floor muscle training women also experienced fewer incontinence episodes per day and less leakage in short office-based pad tests (13). In our study, we observed a significant decrease in complaints of patients with biofeedback treatments. The most important index was the decrease in ICIQ-SF scores from  $18.0750 \pm 2.49499$  before treatment to  $9.9500 \pm 4.39084$  after treatment.

We also determined that repeating pelvic floor muscle exercises at home made very important, positive contributions to treatment, as well as biofeedback treatment, especially when it was applied at the hospital. We emphasized that all patients should do these exercises

at home after the end of their treatment at the hospital so that the current healing would be maintained or improved. We took the fully dry 12 patients and decrease in wet pads of 22 patients as significant indicators of achievement in our study. Additionally, the average BMI of the patients was calculated as 29.136. This suggested that the biofeedback treatment was effective even on patients who were bordered on obesity. These results imply that biofeedback can be applied before biofeedback treatment and could even be an alternative to surgery. Especially because of how most patients fare after surgery, the high levels of comorbid diseases for patients with urinary incontinence, and the risks of surgical treatment, patients adopt biofeedback treatment more than others. In this study, 7 out of 44 patients discontinued the treatment. Five patients refused to perform urodynamic because they felt they were healed, and 2 patients refused the treatment because they did not see any healing. Five of the 55 patients who originally applied for treatment did not come to treatment, citing fears of the method's invasiveness and potential for infection. Only the pre- and posttreatment ICIQ-SF scores of the study patients were compared. We asked, "Is urodynamic treatment necessary for every patient who has SUI?" to determine if there was any significant change before and after treatment in the urodynamic parameters (sensation, instability, capacity, residual urine). Because urodynamic treatment is a minimally invasive but expensive examination, we conclude that it is effective only for a preoperative evaluation. In recent years, behavioral treatment approaches such as diet, bladder training, pelvic floor muscle exercises, and biofeedback have increase in popularity. Most patient complaints can be removed with biofeedback treatment, and a significant decrease is usually observed in their ICIQ-SF scores. The patient's quality of life increases because they either no longer experience incontinence or experience fewer wet pads. Therefore, biofeedback is a good alternative to surgical treatment. -Biofeedback does not make changes in urodynamic parameters, so urodynamic treatment is not necessary for SUI patients who plan to receive biofeedback treatment. However, if surgical treatment is planned, urodynamic studies can be useful.

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## Conflict of interest

None declared.

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