

## DECREASE OF SEVERITY OF STRESS URINARY INCONTINENCE AFTER SURFACE ELECTRICAL STIMULATION IN OLDER WOMEN

### Hypothesis / aims of study

The intravaginal electrical stimulation is the most common technique in clinical practice. However, this treatment can provide an unpleasant vaginal and perineum sensation. Therefore, the objective of this study was to evaluate the effects of surface electrical stimulation (SES) in severity of stress urinary incontinence (SUI) and PFM strenght in elderly women. The hypothesis of this study is that women treated with SES will have better results when compared with the control group.

### Study design, materials and methods

This is a randomized controlled pilot study, performed from November 2010 to March 2011. This study included women over the age of 60 years, with at least one episode of stress urine leakage during the previous month. The exclusion criteria were: previous treatment for UI or hormone therapy, ongoing urinary tract infections, cognitive or neurological disorder, uncontrolled hypertension, inability to perform the proposed procedures, or use of pacemaker implantation or metal rods.

Fourteen women who met the inclusion criteria were randomized according to a computer generated randomization list in two groups: Surface Electrical Stimulation Group (SESG), n=7 (Age: 68.57±10.93 years; Body Mass Index: 26.6±5.80 Kg/cm<sup>2</sup>); Control Group (CG), n=7 (Age: 69.28±6.94 years; Body Mass Index: 26.0±1.81 Kg/cm<sup>2</sup>).

All the participants were evaluated by the same physical therapist at the beginning of the study and after treatment. Each volunteer's assessment included clinical evaluation Incontinence Severity Index (ISI) questionnaire, one-hour pad test, and pelvic floor muscle strength carried out by digital palpation using the PERFECT scheme.

The ISI questionnaire was proposed by Sandvik et al (1) and validated in Brazilian Portuguese (2). It consists of two questions, regarding frequency (four levels) and amount (three levels) of urinary leakage. The score final of the ISI is the multiplication between the two questions. The score 1 represent the better severity of urinary incontinence and 12 represents the worst possible severity.

All participants of SESG performed 12 individual sessions, with two weekly sessions of 20 minutes. The SES of the PFM was performed using the equipment Dualpex 961 (Quark Medical). The women were positioned in supine, with hip and knee flexion. Four surface electrodes were used, two placed in the suprapubic region and two medial to the ischial tuberosity. Electric parameters were frequency at 50Hz, a 4-s to 8-s work-rest cycle and a 700µs pulse width, with stimulation intensity in maximal level tolerable. The women were not instructed to perform the contraction of the PFM in conjunction with SES. The CG did not receive any treatment during the corresponding treatment time.

The statistical analysis was performed using Mann-Whitney test to intergroup analysis and Wilcoxon test in intragroup analysis. The level of significance used was 0.05 and the data were expressed as means ± standard deviations.

### Results

Among the 14 volunteers analyzed in this study, there were no significant differences between groups in terms of demographical and clinical characteristics. In the evaluation of severity of SUI by ISI, there was significant decrease in severity of leakage urinary only in SESG after the treatment (p=0.023). The intergroup analysis showed statistical differences between SESG and CG (p=0.002) after treatment (Table 1).

There was a significant decrease in urinary leakage evaluated by one hour pad test for the SESG (p=0.017); The CG did not present significant difference in this variable. Significant differences were observed between the SESG and CG in the evaluation after treatment (p=0.0017). However, in digital assessment of PFM there was no significant difference after the treatment in both groups. The analysis intergroup of digital assessment also was not found significant difference between groups (Table 1).

Table 1: Values of ISI, one hour pad test and digital assessment of PFM for the groups before and after treatment.

Variable	Groups	Pre Means (SD)	Post Means (SD)	Intragroup p-value	Intergroup Pre p-value	Intergroup Post p-value
ISI	SESG	3.71 (2.05)	0.85 (0.69)	0.023*	0.79	0.002*
	CG	3.85. (1.95)	4.57(3.35)	0.479		
One hour pad test (g)	SESG	9.52 (14.57)	0.07 (0.09)	0.017*	0.22	0.0017*
	CG	7.87 (8.70)	7.73 (7.87)	0.98		
Digital assessment (Power)	SESG	1.28 (0.95)	1.71 (0.95)	0.248	0.565	0.141
	CG	1.14 (0.37)	1.14 (0.37)	1.000		

SD = standard deviations; ISI = Incontinence Severity Index; SESG = Surface Electrical Stimulation Group; CG – Control Group; \* p < 0.05

### Interpretation of results

In the present study it was observed after six weeks of treatment, a significant reduction of severity of SUI and urinary leakage in women treated with SES. However, the urinary leakage decrease was not associated with a significant increase in the pelvic floor muscle strength

The improvement in the severity of urinary incontinence, evaluated by ISI, indicates that women observed a lower number of urinary leakages in their daily life activities. The decrease of Pad Test value is an objective assessment that confirms the improvement of urinary leakage in these women. A study (3) performed the treatment with SES and after fifteen sessions found an improvement in pad test value e PFM strenght contraction.

However, the result of study indicated that the improvement of SUI severity and pad test value not was associated with the increase of PFM strenght. The possible hypothesis for this result is that the treatment was realized during six weeks, and in the first eight weeks of treatment is accepted that neural factors have important role in muscle strength gain. The first weeks of SUI treatment is normal occur improvement of urinary leakage without gain of strength and hypertrophy of PFM. The possible explication of this result, is that occur an improve of motor units recruitment and increase blood flow to the urethra and PFM, improving the urethral closure mechanism and the SUI.

The limitation of this study is the sample size. Studies futures can evaluate with electromyography the possible modifications in muscle recruitment during the treatment with SES. Furthermore, is important evaluate the hypertrophy of PFM with eight or more weeks of treatment with SES.

### Concluding message

The SES is a treatment without discomfort or embarrassment for the patient, and that was effective to decrease the urinary leakage and severity of SUI in older women.

### References

1. Sandvik H, Hunskaar S, Seim A, Hermstad R, Vanvik A, Bratt H. Validation of a severity index in female urinary incontinence and its implementation in an epidemiological survey. J Epidemiol Community Health. 1993;47(6):497-9.
2. Pereira VC, Santos JYC, Correia GN, Driusso P. Translation and validation into Portuguese of a questionnaire to evaluate the severity of urinary incontinence. RBGO. 2011;33(4):182-7
3. Demirtürk F, Akbayrak T, Karakaya IC, Yüksel I, Kirdi N, Demirtürk F, Kaya S, Ergen A, Beksac S. Interferential current versus biofeedback results in urinary stress incontinence. Swiss Med Wkly. 2008;138(21-22):317-21.

### Disclosures

**Funding:** São Paulo Research Foundation (FAPESP) Coordination for the Improvement of Higher Education Personnel (Capes) **Clinical Trial:** Yes **Public Registry:** Yes **Registration Number:** Brazilian Clinical Trials Registry (REBEC): RBR-7gt9pb **RCT:** Yes **Subjects:** HUMAN **Ethics Committee:** Comitê de Ética e Pesquisa em Seres Humanos da Universidade Federal de São Carlos **Helsinki:** Yes **Informed Consent:** Yes