

IS THERE ANY DIFFERENCE BETWEEN VOLUNTARY AND ELECTRICAL STIMULATED PELVIC FLOOR CONTRACTIONS?

Hypothesis / aims of study

Pelvic floor muscle training (PFMT) is an effective therapy to improve stress urinary incontinence (SUI) symptoms. PFMT is achieved by means of repetitive contraction of the pelvic floor muscles. Patients can be trained by direct instructions to perform voluntary contractions (VC), aided or not by biofeedback and by means of vaginal electrical stimulation (VES). There are some studies applying pelvic floor ES to activate the muscular fibers contraction, which demonstrated that ES is effective on SUI treatment. ES and voluntary muscle contraction constitute different mode of muscle activation and induce different acute physiological effects on the neuromuscular system (1).

To our knowledge, few studies have focused on human pelvic floor muscle contraction with or without ES. We present our preliminary results comparing VES, VC, VES + VC to determine which modality of stimulation reach. We also compared muscle strength between the pelvic floor voluntary contraction and ES in a period of 1 to 30 minutes.

Study design, materials and methods

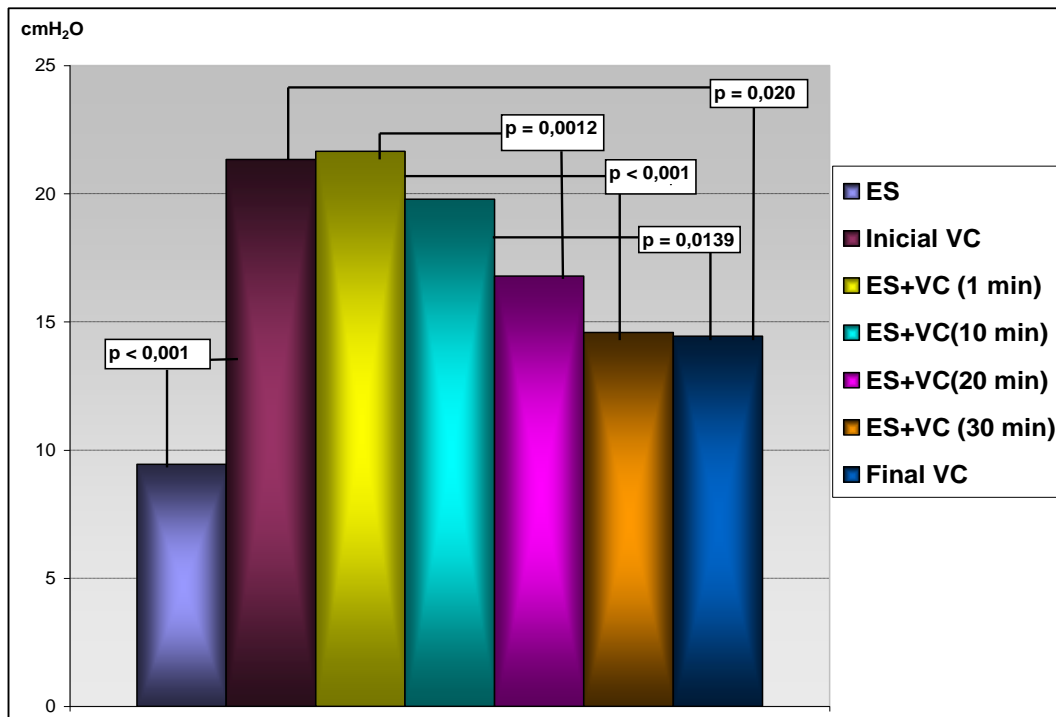
It was included patients with clinical and urodynamic SUI referred to pelvic floor muscle training program. It was excluded patients with history of SUI surgery, pelvic organ prolapse stage ≥ 2 (POP-Q), and vaginal or urinary infection. Initially, patients received orientation about the correct form to perform PFM contractions. After this training, when they were performing good contractions, the protocol was initiated. Patients received electrical stimulation (ES) by means of vaginal electrode. To determine the perineal pressure during pelvic floor muscle contraction, it was utilized an anal pressure fluid filled device connected to the urodynamic transducer (Dynamed – Urodynamic System). The electrical parameters were 50Hz square waves, 500 μ s pulse duration, with a maximum output of 50mA. The ES was delivered in cycles of 5 seconds on/off. The evaluation was performed during a 30 minutes PFMT session. The anal sphincter pressure registration was obtained during VC without ES, VC along with ES and ES alone, during the session. During the 30 min. PFMT, patients were oriented to contract the pelvic floor muscles along with the ES as much powerful as they would be able to, without contracting accessory muscles, like abdominals, gluteus and adductors. The perineal pressure was determined before the PFMT session, in the first minute, 10 minutes, 20 minutes, 30 minutes and immediately after it was finished.

Results

We evaluate 14 women with SUI with mean age of 53.8 years old. Figure 1 shows the mean maximum pressure values obtained in the time-points evaluated. The VC alone was more powerful than ES alone ($p < 0,001$) and a 100% of the volunteers had ES contraction lower than VC. Between the initial and the final VC there was a decrease of 32,34% in the perineal pressure ($p = 0,020$). During the PFMT the first minute of contraction was significant more powerful than 20th and 30th minute ($p = 0,0012$ and $p < 0,001$). One hypothesis is that the patients couldn't support higher intensities of ES in the used parameters. So, ES couldn't produce a good pelvic floor contraction.

The VC alone was more effective in generate perineal pressure than ES alone. Adding ES to VC did not add any increase in pressure. ES didn't increase the pelvic floor contraction and strength.

Figure1. Comparison between the anal pressure in cmH₂O.



ES = Electrical Stimulation alone
 VC = Voluntary Contraction alone
 1st, 10th, 20th, 30th min = time-point performed the analysis
 Final VC = VC after 30 min PFMT

Interpretation of results

In studies with other skeletal muscles like quadriceps, an association of ES and VC restored more functional abilities than just one of the therapies alone (1).

Regarding the pelvic floor muscles, the ES can help muscle rehabilitation as a sensitive feedback and not as a method of strengthening. ES is very used in clinical practices in order to obtain strength gains. With this pilot study we tried to determine the role of ES in the training process. It may be helpful in the initial part of rehabilitation, when patients cannot contract correctly the pelvic floor muscles (2) and need a sensorial improvement. Based on our initial results, it seems that vaginal electrical stimulation did not reach a pelvic floor muscle contraction as good as voluntary contraction. The use of Electrical stimulation to aid PFMT, especially on SUI treatment may not be necessary and may be less effective than VC. Interestingly, we observed that 30 minutes of PFMT decrease muscular occlusion pressure, suggesting a possible muscular fatigue.

Concluding message

The present study suggests that the ES alone cannot generate maximal pelvic contraction. Voluntary contraction alone was more effective in generate perineal pressure than ES alone. Adding ES to VC did not add any increase in pressure. ES didn't increase the pelvic floor contraction and strength. After 30 minutes of pelvic floor muscular work there was a significant decrease in muscular occlusion pressure.

References

1. Pillard T, Sports Med 2008; 38 (2): 161-177
2. Hesse et al, Neurourol Urodyn 1990; 9: 397-8

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Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	COMITÊ DE ÉTICA EM PESQUISA da UNIFESP/EPM
Was the Declaration of Helsinki followed?	Yes
Was informed consent obtained from the patients?	Yes