



564 Treatment of urinary incontinence after radical prostatectomy by extracorporeal magnetic stimulation

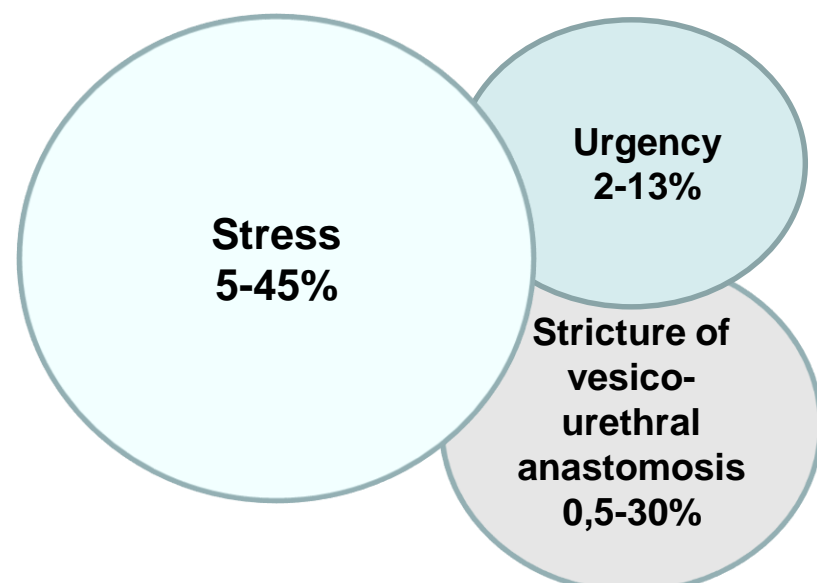
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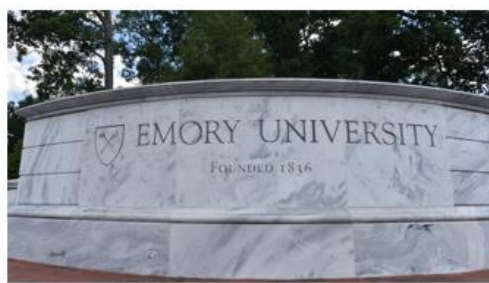
Introduction

Postoperative urinary symptoms have a significant impact on the quality of life of patients undergoing radical prostatectomy (RPE). The main reasons for them are stress urinary incontinence, urgency urinary incontinence and stricture of vesico-urethral anastomosis with stress urinary incontinence being the most frequent urination symptom, which varies widely from 5 to 45% in publications of different authors (Pic. 1).



Pic. 1 Urinary incontinence related complications of radical prostatectomy

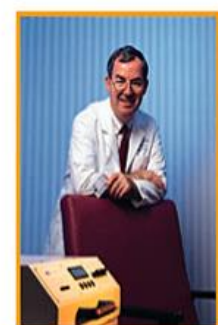
According to the recommendations of the European Urological Association for the treatment of patients with urinary incontinence as a first-line therapy conservative treatment methods with the good safety profile are used. These include: behavioral therapy, training of pelvic floor muscles, electrical stimulation of pelvic floor muscles, biofeedback, magnetic stimulation. Extracorporeal magnetic stimulation was first proposed for clinical use in 1998 in the United States by N. T. M. Galloway (Neocontrol, Neotonus, Inc., Marietta, USA).



Neotonus

Emory founders: neurologist Charles Epstein, urologist Niall Galloway
Location: Marietta
Emory benefits: royalties and equity

Developing technology to deliver magnetic stimulation to muscles and neurons. The Neocontrol Pelvic Floor Therapy System for incontinence was approved by the FDA in 1998, and rapid rate transcranial magnetic stimulation (rTMS) is now being tested in clinical trials on patients with medication-resistant early-onset depression.



Urologist Niall Galloway uses

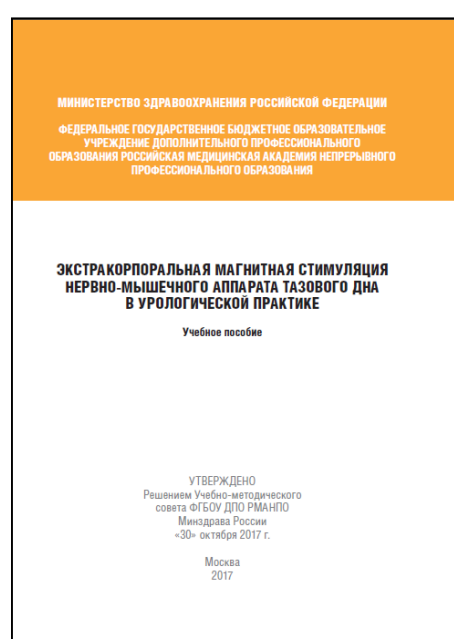


electromagnetic stimulation to treat urinary incontinence, a problem experienced by 15 million Americans.

In the literature presents data on the effectiveness of extracorporeal magnetic stimulation in women with stress urinary incontinence and pelvic muscle dysfunction. Information on the use of this method in patients with urinary incontinence after radical prostatectomy in literature is very few. We have found only 1 article assessing the effectiveness of EMS after robotic-assisted RPE (ссылка на статью о лечении после РПЭ) The aim of the work was to study the effectiveness of extracorporeal magnetic stimulation in the treatment of urinary incontinence after radical prostatectomy.

Methods

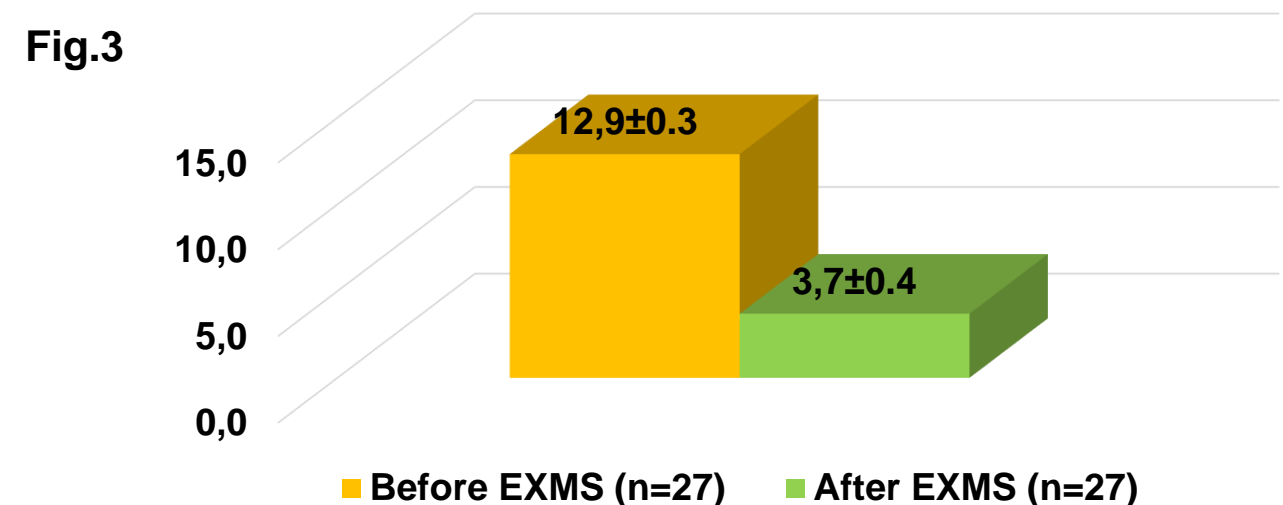
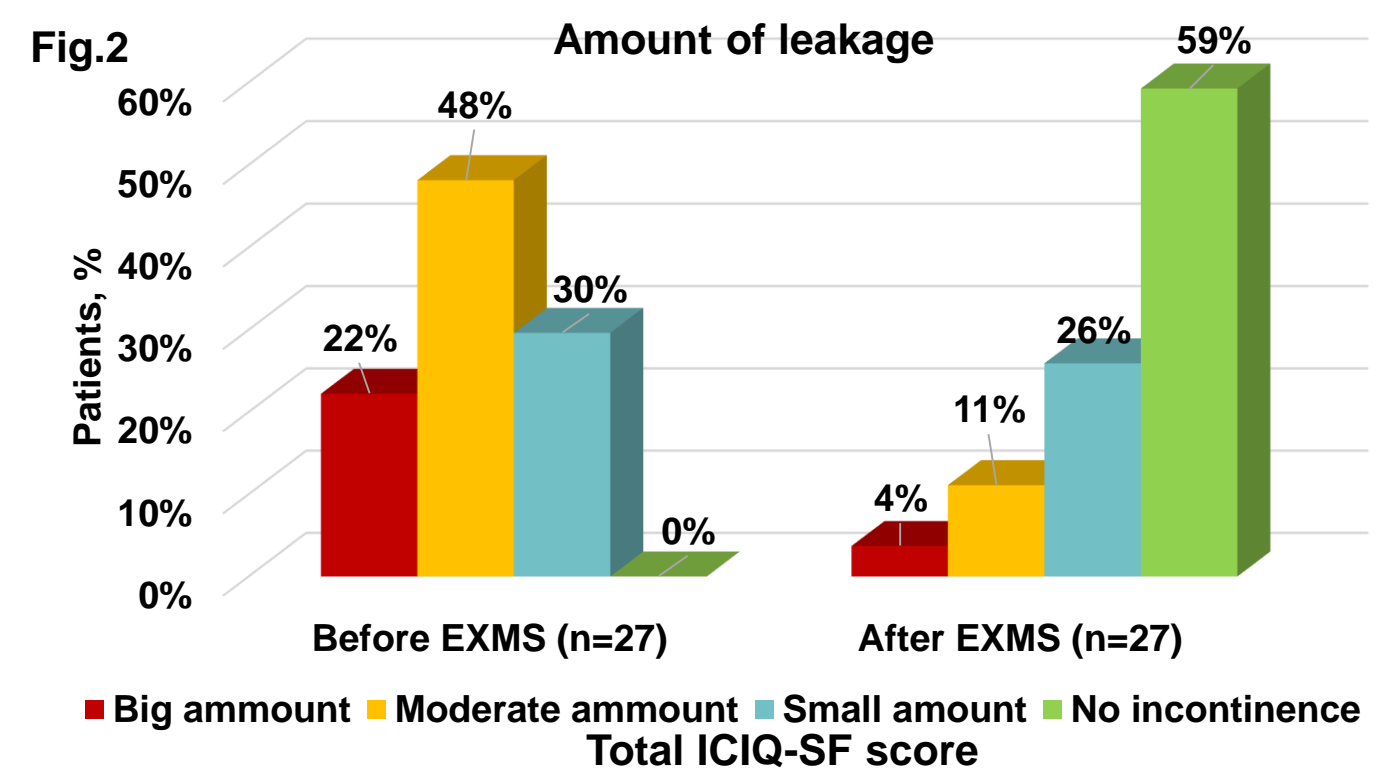
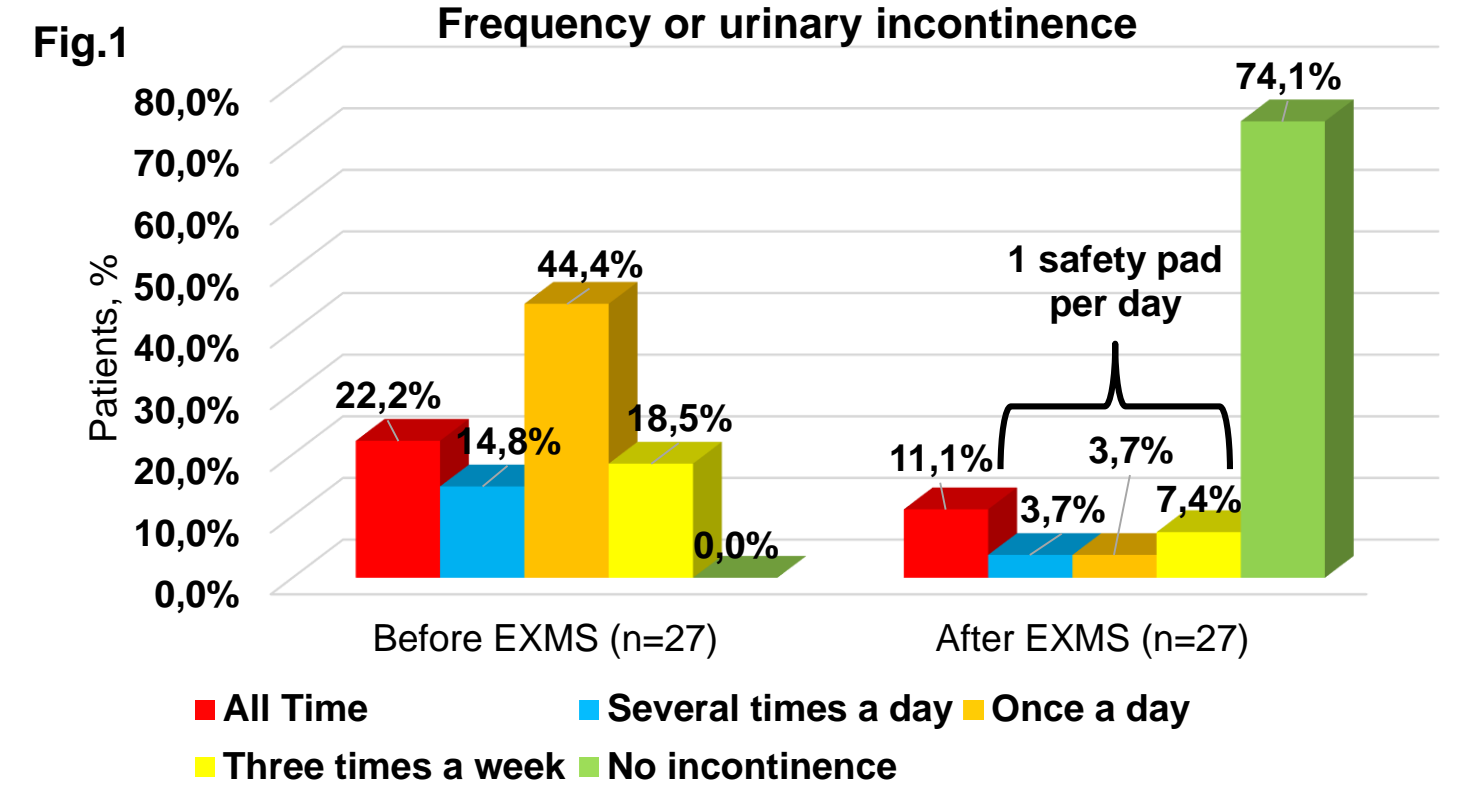
EXMS was performed to 27 patients with urinary incontinence after radical prostatectomy, who suffered from urinary incontinence 3 months after removal of the urethral catheter and performing exercises for the pelvic floor muscles. Open retropubic prostatectomy was performed to 8 patients, laparoscopic prostatectomy was done to 19 patients. All patients had a low or intermediate risk group for prostate cancer according to the D'Amico classification, no regional lymph node involvement, PSA level in 3 months after surgery was less than 0.2 ng/ml and there were no other signs of recurrence of prostate cancer. The mean age of patients was 65.7±7.1 years. Before start of the therapy 6 (22.2%) patients reported about «all time» frequency of urinary incontinence, 4 (14.8%) patients «several times a day», 12 (44.4%) had urinary incontinence once a day and 5 (18.5%) had it three times a week (Fig. 1). Extracorporeal magnetic stimulation was carried out using a system extracorporeal magnetic stimulation of the pelvis "Avantron", manufacturer "Rehabilitation technologies", Russia. During the procedures patients sit on chair with magnetic field generator. Stimulation was carried out at a frequency of 10 Hertz for 10 minutes and at frequency 50 Hertz 10 minutes, 2-3 times a week, the course of treatment was 12 procedures, intensity of magnetic field selected individually to avoid unpleasant sensation during procedure. Maximal power of magnetic field is 0.4 Tesla. The effectiveness was evaluated by the dynamics of complaints of urinary incontinence, according to the micturition diary, International Conference on Incontinence Questionnaire Short Form (ICIQ-SF) questionnaire.



Results

In the control examination after 12 sessions of EXMS, urinary incontinence was maintained in 3 (11.1%) patients, 4 (14.8%) patients used 1 safety pad, and complete urinary retention was achieved in 20 (74.1%) patients. Analysis ICIQ-SF questionnaire find out significant improvement in symptoms and quality of life. The average score on the ICIQ-SF scale also decreased when answering questions about the frequency of urine leakage, its amount and the effect of urinary incontinence on daily life ($p < 0.05$) (Fig 1 and Fig 2).

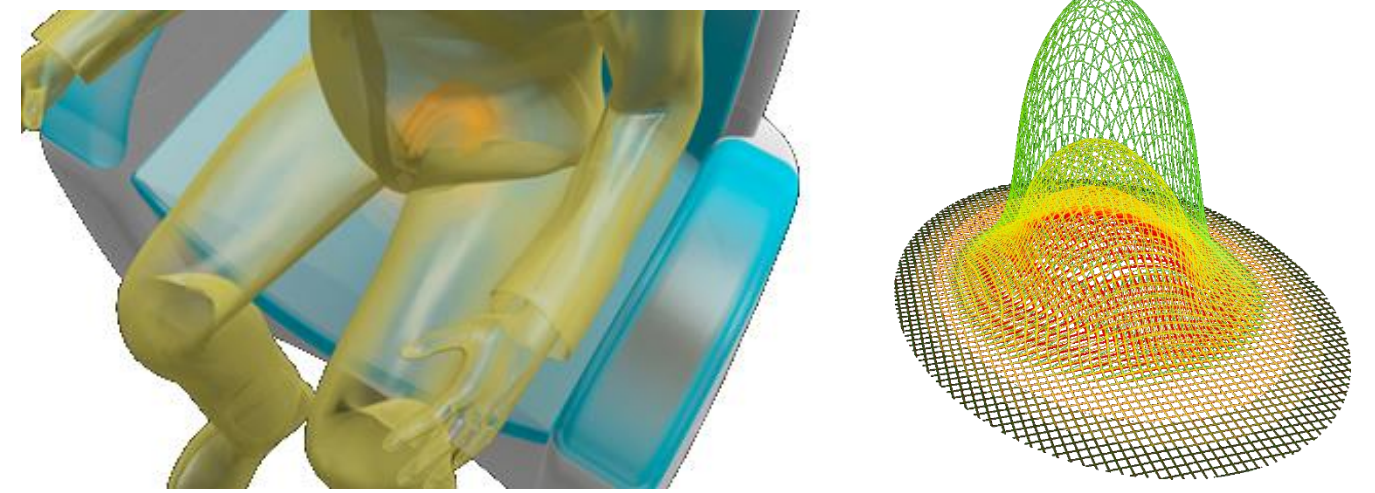
The total score of ICIQ-SF scale after performing exercises for pelvic floor muscles decreased from 12.9±0.3 to 3.7±0.4 ($p < 0.05$) (Fig.3).



Interpretation of results

The extracorporeal magnetic stimulation treatment lead to improvement in postprostatectomy stress urinary incontinence. This improvement was more fast and intensive that just doing pelvic floor exercises. The procedure was well tolerated, there were no any adverse events.

EMS is a recent technique for noninvasively stimulating the central and peripheral nervous system. The principle of action of EMS is based on Faraday's principle of magnetic induction, in which a pulsating magnetic field is generated. When the patient, fully clothed, sits down on the treatment chair, a strong electric current begins in the stimulation coil, and a magnetic field is generated around the stimulation coil. An eddy current is then induced in the patient's pelvic floor muscles. The magnetic waves penetrate the pelvic floor and locally stimulate the muscles by activating the nerves. The effect seems to involve not only the motor, but also the sensory fibers of the pelvic floor innervations. Thus the therapeutic effect, in our opinion, was caused by excitation of peripheral nerve fibers, contractions and training of striated muscles of the pelvic floor, smooth muscle elements of the bladder, urethra, blood vessels and improvement of microcirculation



Conclusions

Extracorporeal magnetic stimulation of the neuromuscular part of the pelvis is an effective and save method of treatment of patients with stress urinary incontinence after radical prostatectomy and can be used in the program of postprostatectomy rehabilitation.

References

- D'Ancona C, Haylen B, Oelke M et al. The International Continence Society (ICS) report on the terminology for adult male lower urinary tract and pelvic floor symptoms and dysfunction. *Neurourology and Urodynamics*. 2019;1-45.
- Shafik A. Re: A prospective, randomized, placebo controlled, double-blind study of pelvic electromagnetic therapy for the treatment of chronic pelvic pain syndrome with 1 year of followup. *J Urol*. 2006;175:1964-1965;
- N.T.M. Galloway et al. Update on extracorporeal magnetic innervation (ExMI) therapy for stress urinary incontinence. *Urology*. Supplement. 2000. № 6A. P. 82-85.
- Redondo C et al. Complications of radical prostatectomy *Esp Urol* 2017 Nov;70(9):766-776