Effectiveness of extracorporeal electromagnetic stimulation in women with stress urinary incontinence with ultrasound control of pelvic floor muscles

Artem Loktev[1], Natalia Krotova[1] Nadezhda Zemskova[1]

1: Fomin Clinic, Moscow, Russian Federation

Introduction

Stress urinary incontinence (SUI) is a common problem, especially among women of reproductive and postmenopausal age.

The pathology significantly reduces the quality of life of female patients, causing psychological discomfort and limitations in social activity.

Modern non-invasive treatment methods, such as extracorporeal electromagnetic stimulation (ES), are becoming an important direction in the therapy of SUI.

Aim

To evaluate the efficacy of extracorporeal electromagnetic stimulation (ES) in women with SUI type 1-2 using ultrasound monitoring of the pelvic floor muscles before and after treatment.

Method

The study included 20 women aged 35 to 45 years with diagnosed SUI type 1-2.

- All participants underwent an initial examination including history, urinary diaries, pelvic floor ultrasound (PFU) and completion of the ICIQ-UI SF questionnaire.
- Patients received ES treatment at a frequency of 2 sessions per week, 10 sessions total. The duration of one session was 20 min.
- The procedure was performed on the Salus Talent Pro device, power 3 Tesla.

The stimulation mode was multimodal with a combination of frequencies from 2-3 Hz to 35 Hz. This frequency spectrum corresponds to the modes of operation of the nervous system in the alpha and betta rhythm, has a stimulating effect on the nervous system, and as a consequence, the inclusion of muscle-tone effect.

- Ultrasound control of the pelvic floor muscles was carried out before and after the course of treatment.
- Clinical dynamics was assessed according to the ICIQ-UI SF scale and subjective feelings of the patients.

Extracorporeal magnetic stimulation device (Salus Talent Pro) – photo 1.

Tabl.1 Magnetic Stimulation Protocol for Pelvic and Bladder Conditions

NAME	MODE	AREA	FREQUENCY, Hz	INTENSITY	TIME
Pelvic pain	M7	Pelvic floor, sacrum, lumbar area	10, 50 Hz	2% to 100%	20 min
Urinary incontinence	A2	Pelvic floor	3-23 Hz	2% to 100%	20 min
Hypoactive bladder	A2	Bladder	3-23 Hz	2% to 100%	10 min
		Pelvic floor, sacrum, lumbar area	3-23 Hz	2% to 100%	10 min
Hyperactive bladder	A2	Pelvic floor, sacrum, lumbar area	3-23 Hz	2% to 100%	10 min
		Tibial nerve	3-23 Hz	2% to 100%	10 min

Extracorporeal magnetic stimulation device (Salus Talent Pro). Auto regime, frequency of 1-4 Hz (tetta rhythm) – photo 2 .

Results

The treatment demonstrated significant improvements in both objective and subjective measures related to urinary incontinence (UI) and quality of life. Here is a concise discussion of the key findings:

1. Objective Improvements

Muscle Thickness : The average thickness of the puborectalis muscle, as measured by ultrasound, increased from 7.2 ± 1.1 mm before treatment to 9.8 ± 1.3 mm after treatment ($p < 0.01$). This statistically significant increase indicates enhanced muscle strength and tone, which are critical for improving pelvic floor function.

ICIQ-UI SF Score : The mean International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form (ICIQ-UI SF) score decreased from 14.5 ± 2.3 to 5.2 ± 1.8 ($p < 0.01$). This substantial reduction reflects a marked improvement in symptoms and overall urinary control.

2. Subjective Improvements

Symptom Resolution : Positive dynamics were observed in 90% of patients:

65% experienced complete disappearance of urinary incontinence symptoms.

25% showed significant improvement, with rare episodes of incontinence remaining.

Quality of Life : A remarkable 95% of patients reported improved quality of life, highlighting the treatment's impact beyond physical symptoms.

Patient Satisfaction : Notably, 85% of patients expressed willingness to recommend the treatment to other women, indicating high satisfaction and confidence in its efficacy.

3. Ultrasound Confirmation

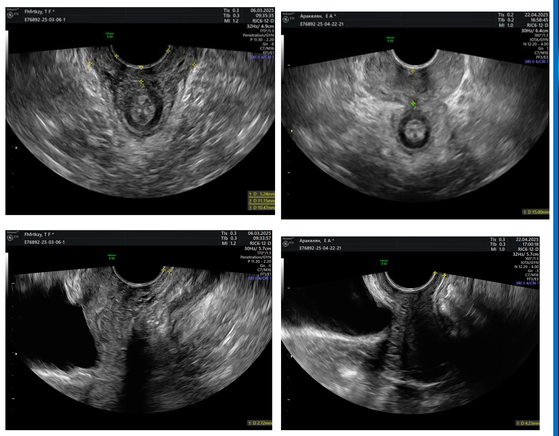
Ultrasonography confirmed an improvement in the tone of the pelvic floor muscles. This objective validation supports the clinical significance of the observed changes in muscle thickness and symptom resolution.

4. Overall Impact

The treatment effectively addressed both structural and functional aspects of UI. The increase in puborectalis muscle thickness suggests enhanced muscle strength, while the significant reduction in ICIQ-UI SF scores and patient-reported outcomes indicate a meaningful improvement in symptoms and quality of life.

The high level of patient satisfaction and willingness to recommend the treatment further underscores its effectiveness and acceptability.

Before After



Ultrasound images of the pelvic floor muscles before (1,2) and after treatment (3,4).

Conclusion

- Extracorporeal electromagnetic stimulation showed high efficacy in the treatment of SUI type 1-2 due to the muscle-tone effect.
- Ultrasound control allowed an objective assessment of changes in muscle size.
- The method is safe, non-invasive and well tolerated by the patients.

Acknowledgements

The authors would like to thank “REMED COMPANY” for supplying the magnetic stimulation device utilized in this investigation. Their contribution played a vital role in the successful completion of this study.