

# TRANSVERTEBRAL AND TRANSCRANIAL MAGNETIC NEUROMODULATION IN THE TREATMENT OF DETRUSOR UNDERACTIVITY: 6 MONTHS FOLLOW-UP

## INTRODUCTION

Detrusor underactivity is one of the most challenging issue in neurourology. Its etiology often remains unclear and current treatment options frequently fail to meet the expectations of both patients and physicians

## AIM

The aim of the study was to evaluate the effectiveness of transcranial and transvertebral neuromodulation in treating detrusor underactivity

## METHOD

The study included 26 patients. The treatment course consisted of 20 procedures (performed four times a week for five weeks). Transcranial neuromodulation was conducted twice a week, and transvertebral neuromodulation was also performed twice a week. The transcranial stimulation protocol involved a figure-eight coil targeting the supplementary motor area, with continuous stimulation at 20 Hz for 15 minutes. The transvertebral neuromodulation protocol used a figure-eight coil targeting the sacral spinal cord zone S2–S4, with continuous stimulation at 20 Hz for 25 minutes. Subjective complaints were assessed before and after treatment at 1, 3, and 6 months. Objective indicators were evaluated using multichannel urodynamic studies before treatment and at 6 months post-treatment.

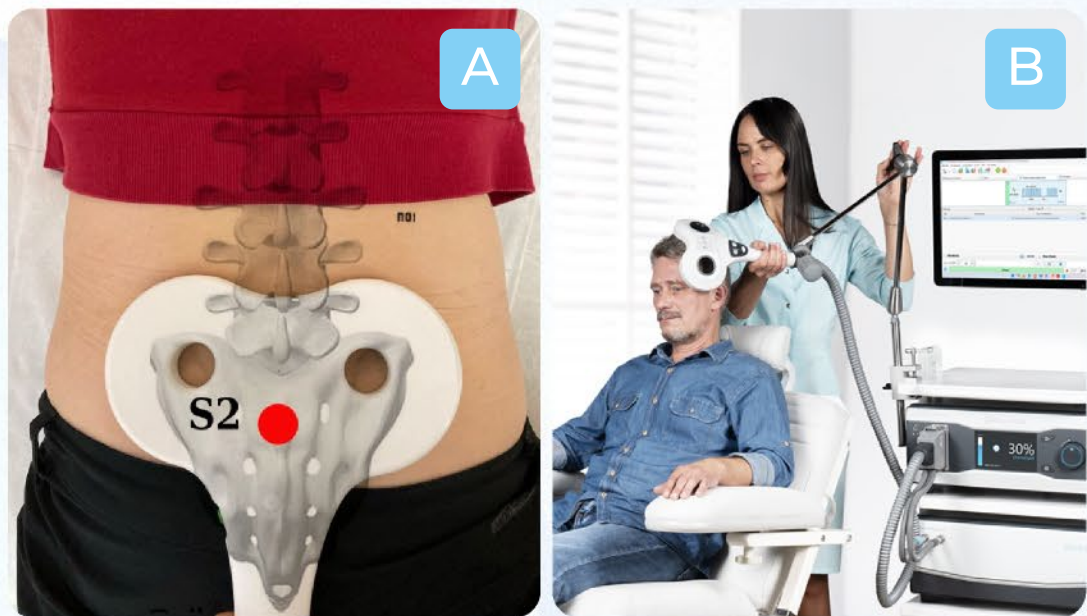


Figure 1 (A, B). Positioning of figure-eight coil for transcranial and transvertebral neuromodulation. A: stimulation of the supplementary motor area. B: stimulation of the sacral spine.



Figure 2. Bladder contracline was determined using multichannel urodynamics on the «UroSmart» (A) urodynamic system with a built-in Rivus uroflowmeter (Neurosoft) (B)

## RESULTS

A significant improvement in the subjective condition of patients was achieved at all stages of observation. All patients included in the study underwent a full course of neuromodulation. Six patients chose to resume independent urination instead of relying on intermittent catheterization.. Magnetic neuromodulation had the greatest impact on such urodynamic parameters as the first feeling of filling, the first feeling of urge, residual volume, and maximum cystometric capacity. The detrusor contractility index increased from an average of 11.9 before treatment to 22.8 after treatment.

INDICATIONS	N	MEDIAN		MIN		MAX		SD	
		BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER
PVR, ml	26	183,00	100,00	103,00	68,00	301,00	192,00	121,00	114,00
First sensation, ml	26	191,00	111,00	120,00	85,00	201,00	132,00	119,00	98,00
First desire, ml	25	229,00	194,00	209,00	105,00	358,00	281,00	209,00	174,00
Capacity	26	560,00	451,00	490,00	320,00	650,00	515,00	481,00	399,00

Table 1 presents the urodynamic parameters before and 6 months after treatment.

## CONCLUSION

The study demonstrated a significant therapeutic benefit of combined transvertebral and transcranial magnetic neuromodulation in patients with detrusor underactivity. However, further large-scale, placebo-controlled studies are necessary to develop universally effective protocols for the treatment of lower urinary tract dysfunctions

### CONTACTS

Kovalev Gleb MD PhD, Labetov Ivan MD, Smagulov Askar MD, Myrzaliev Saule MD, Berdichevskaya Anna MD (Scientific and Clinical Center of Neurourology, Saint-Petersburg, Moscow Russian Federation/Almaty, Kazakhstan), Loginov I.V, Maslyukova A.V, Loginova M.V, Smirnov N.A (Ivanovo State Medical Academy, Ivanovo, Russia)  
Email: [info@neurosoft.com](mailto:info@neurosoft.com) | [neurosoft.com](https://neurosoft.com)