

## EXTRACORPOREAL MAGNETIC STIMULATION FOR THE TREATMENT OF OVERACTIVE BLADDER

### Aims of Study

Magnetic stimulation continues to evolve as a non-invasive technique for stimulating the sacral nerves and pelvic floor and maybe activates the inhibitory reflex pathway to the detrusor via a mechanism similar to that of electrical stimulation. We investigated the efficacy and effects of extracorporeal magnetic stimulation (EMS) for patient with overactive bladder on frequency/volume chart and urodynamic parameters.

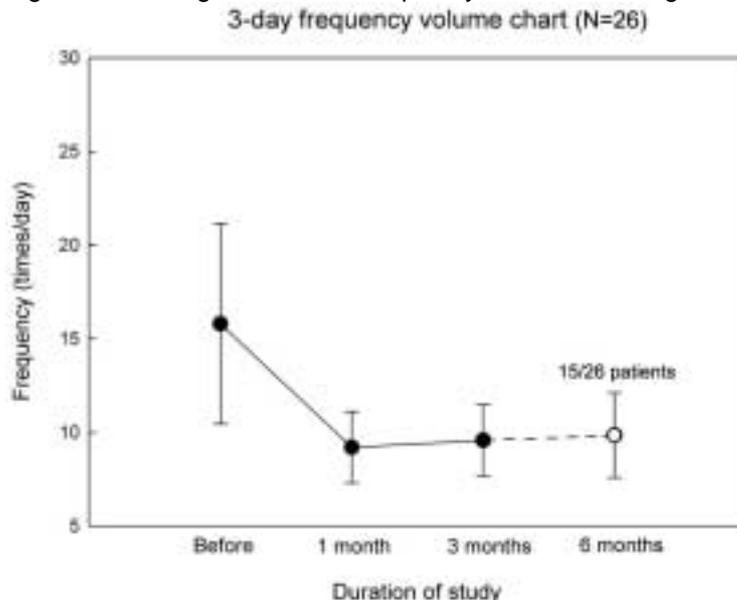
### Methods

A total of 26 patients (2 men and 24 women; mean age 39.5 years) with the overactive bladder symptom were studied. We applied 10Hz. repetitive magnetic stimulation for 20 minutes, twice a week for 6 or 7 weeks. The magnetic stimulator unit was set on an armchair type seat and applied to patients fully clothed. Patients with severe vaginal atrophy, pelvic prolapse, cardiac disorder including on demand heart pacemakers, metallic implant, neurogenic bladder dysfunction, pregnancy, and previous pelvic radiation, were excluded from study. We asked patients to complete 3-day frequency/volume chart and answer a quality of life questionnaire before, 1, 3, and 6 months after the last stimulation. Also, filling cystometry (CMG) was performed in 11 cases to evaluate urodynamic parameters before and 1 month after last stimulation.

### Results

Among the 26 patients who were observed for up to 3 months, the mean number of voids daily decreased in 23 patients, increased one patient, and did not change in two patients. The mean number of voids daily significantly decreased by 38.1% (from  $14.7 \pm 4.7$  to  $9.1 \pm 8.4$ ,  $p < 0.001$ , Figure 1). Before treatment 1 or more episodes of urge incontinence were presented in 8 patients (31%) and resolved in 4 cases after stimulation. In contrast, no significant change was observed in the mean of functional bladder capacity in before and after stimulation ( $310 \pm 132.6$  ml. vs.  $330.1 \pm 133.2$  ml,  $p = 0.176$ ). Of 15 patients who were observed for up to 6 months, therapeutic effect were persist in 14 patients (93%) and the mean number of voids daily were significantly decreased from  $15.8 \pm 5.3$  to  $9.9 \pm 2.3$  ( $p < 0.001$ ).

Figure 1 – Change in 24-hour frequency after electromagnetic stimulation for OAB



Contrary to the symptom relief, urodynamic investigations showed no significant changes on bladder capacity at first desire to void and maximum bladder capacity (n=11, Table 1). Filling CMG before stimulation revealed a detrusor overactivity in 7 patients. After stimulation detrusor overactivity was resolved in 2 patients. The mean bladder capacity and detrusor pressure at first uninhibited contraction in patients with detrusor overactivity showed no significant changes. Quality of life after treatment was rated as 'most satisfied' by 3 patient (12%), 'satisfied' by 9 (35%), 'fair' by 10 (38%), and 'dissatisfied' by 4 (15%) at 3-month follow up. No adverse effects were noted by stimulation.

Table 1 – Changes in urodynamic parameters in 11 patients

<b>UDS parameters</b>	<b>N</b>	<b>Before</b>	<b>After*</b>	<b>p-value</b>
<b>Bladder capacity at 1st desire to void (ml)</b>	11	114.5±80.6	107.6±40.8	0.809
<b>Maximum bladder capacity (ml)</b>	11	347.5±98.1	364.7±92.3	0.238
<b>Bladder capacity at 1st uninhibited contraction (ml)</b>	5	234.0±82.6	179.6±135.0	0.502
<b>Amplitude of detrusor pressure at 1st uninhibited contraction (cmH<sub>2</sub>O)</b>	5	43.9±20.6	28.9±25.4	0.195

\*1 month after last stimulation

### **Conclusions**

EMS significantly improved overactive bladder symptoms (88.5%) and most patients satisfied to the results. Furthermore, improvements appear to maintain at least 6 months after treatment. These results suggest that EMS may have a long-term efficacy. The novel use of EMS may be a promising alternative treatment modality for overactive bladder.