

## EXAMINATION OF A LUMBOSACRAL NERVE ROOT STIMULATION WITH SURFACE MAGNETIC COIL AGAINST OVER ACTIVE BLADDER

### Aims of Study

Recently, the number of reports on stimulating the lumbosacral nerve root with a surface magnetic coil have been increasing. Application of this stimulation gives only a little pain and discomfort to patients, and can be applied over clothes. The stimulation method is simple and can achieve a good effect after a single or small number of stimulations. Though the number of reports concerning the application of the lumbosacral nerve root stimulation with a surface magnetic coil is increasing, diseases to apply this stimulation and application method to are not yet established, and there are few reports on the long term usage results.

This time, we applied the lumbosacral nerve root stimulation with surface magnetic coil to diseases of pollakiuria urgency with variations of stimulation frequency and different coil shapes, and examined these effects together with other reports. Further, we also examined the long term results for as long as possible.

### Methods

We took 20 OAB patients mainly suffering from pollakiuria and with a residual urine volume is less than 50 ml and those for whom anti-choline medicines are not effective. Among them, cases available for evaluation were four cases of Parkinson's disease, one case of spinocerebellar tract degeneration, three cases of brain infarctions, and three with not-known-causes. Their average age was 72.4 (5480), and there were four males and six females.

We applied the coils so that they were close to a sacrum over a cloth in order to stimulate S2 and S3. Before actual stimulation, we monitored reactions of the anal sphincter and lower limbs, and determined the position and intensity. Stimulated at 50 to 70% intensity and 8 Hz, ON for 10 seconds and OFF for 50 seconds, we repeated this cycle for 10 minutes. We applied this method once a day and continued for 6 days. We used "Magstim rapid" (Magstim Company Ltd.) stimulation equipment and 90 mm coils and 70 mm double coils. We evaluated the results by I-PSS, QOL frequency volume chart and a urodynamics study for 1 to 12 weeks before and after applications.

### Results

After 4 to 12 weeks of magnetic stimulation, the IPSS (irritative) has improved for 66.7 % of the cases (average from 12.0 points to 8.3 points). QOL was improved for 33.3 % of the cases (average from 4.8 points to 3.9 points). The one time urination volume was improved for 20 % (average from 119.8 ml to 163.9 ml). The one day urination volume was improved for 70 % (average from 13.7 times to 9.4 times). No remarkable abhorrence or significant side effects were recognized.

### Conclusions

Besides QOL and one time urination volume, improvements as to other items were recognized. After comparing our results and other reports, good effects and their continued effectiveness periods were almost the same concerning objective symptoms. However, concerning self-awareness, our results of improvement ratios were lower than shown in other reports. For two cases of not-known-causes, there was no improvement as to both self-awareness and objective symptoms. The cases of brain infarctions showed remarkable improvement as to objective symptoms compared with other reports. It is not known whether this was due to the different stimulation method. However, one element is that the magnetic stimulation affects to the central nervous system, and this fact suggests that our stimulation was effective for OAB that were caused by central nervous system trouble.

Though the lumbosacral nerve root stimulation with surface magnetic coil cannot be said to be an established therapy, it is not invasive and there are no side effects. It will be probable that this method will become one of therapies employed by general clinical practitioners. As to this point, the establishment of stimulation methods for objective morbidities and examination of its long term application are required.

### **References**

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