

injections and penile vascular and prosthetic surgery.

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## Editorial comment

The investigator, who has made many contributions to the development of neurourology is the first to show that magnetic stimulation at the infrapubic level is effective to induce penile erection in humans. This is an interesting finding that may be clinically applicable in the future.

To put Shafik's finding into perspective it is important to note that magnetic and electric stimulation have the same principal: **excitation of neu-**

**rons**. In the former by an electric current that is produced by a changing magnetic field; in the latter by an electric current, that is directly applied to the neuron.

The concept of electrostimulation of penile erection is not new. In 1985, Lue *et al* were the first to show in animal experiments that electrical stimulation of the cavernous nerves elicits penile erection.<sup>1</sup> The first electrically stimulated erections

in humans were observed by Brindley, in 1988. He demonstrated that stimulation of the anterior roots S2, S3 and S4 improves micturition, defecation and penile erection in patients with spinal-cord injuries.<sup>2</sup> Stief *et al* demonstrated that sacral root stimulation results in measurable changes of the electrical activity of the corpus cavernosum.<sup>3</sup>

In the era of nerve sparing radical prostatectomy the concept of electrical stimulation of the cavernous nerves and the subsequent measurement of the cavernosal response regained interest, with the aim to find better ways to identify the cavernous nerves intra-operatively. Lue *et al* succeeded to elicit an erectile response in 8/16 men when stimulating at the prostatic apex at the time of radical prostatectomy and in 5/6 patients when stimulating in the hilum of the penis at the time of venorestrictive surgery. Due to technical limitations however this method did not find a widespread clinical application as yet.<sup>4</sup> One year before, Shafik reported an astonishing 100 percent success rate of extrapelvic cavernous stimulation in 15 men with absent nocturnal erections, suggestive of neurogenic ED.<sup>5</sup>

In comparison to electrostimulation, the obvious advantages of magnetic stimulation are that it is non-invasive, painless and that neurons in sites relatively inaccessible to electrical stimulation can be stimulated. The disadvantage of magnetic stimulation is its lack of focality, which renders selective stimulation of distinct fibers virtually impossible. Moreover, limitations to stimulation intensity due to the overheating of the stimulator coil in repetitive nerve stimulation and versatility and costs of the equipment make its use unpractical. Part of these problems may be resolved by the design of coils with a more focused stimulus geometry and cooling devices.

Based on the above, it is apparent that the development of penile magnetic stimulation is

promising but has not yet reached the stage to be used in the treatment of ED in everyday practice. How can a patient apply adequate magnetic stimulation during the act of coitus? However, it seems to be applicable in a diagnostic setting. One of the scenarios may be the measurement of magnetic evoked potentials in the corpus cavernosum, to obtain information on the integrity of the cavernous nerves and body.

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EJ Meuleman  
University Hospital Nijmegen,  
Department of Urology,  
Geert Grootplein 16,  
PO Box 9101,  
6500 H.B. Nijmegen,  
The Netherlands