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Motor evoked potentials from the pelvic floor

Proper function of the lower urinary tract depends on the integrity of the central and peripheral nervous pathways on multiple levels, and the complexity of this system leaves it susceptible to even minor lesions. While dysfunction of the lower urinary tract is prevalent amongst patients with nervous system disease, e.g. multiple sclerosis, most women with lower urinary tract dysfunction have no overt neurological cause. Refined neuro-diagnostic approaches are needed to reveal neurogenicity in these patients. A potential method is transcranial magnetic stimulation, which is used routinely to test the motor innervation of limb muscles, but also can be applied to test pelvic floor efferents. To resolve the lack of methodological clarity and the need for normative values for the use of pelvic floor motor evoked potentials (MEPs), 30 healthy women and 16 women with multiple sclerosis were studied. The healthy women underwent MEP studies with various stimulus and recording modalities, and, to test reproducibility, 18 of them were retested at a separate session. The women with multiple sclerosis underwent MEP testing as well as urodynamic studies. From the methodological studies of healthy women, the use of invasive concentric needle electrodes was found to be superior to surface electrodes. When applying magnetic stimuli over the sacral region, various methodological problems were encountered. In the healthy women, a large variability of responses was noted, the long-term reproducibility of pelvic floor MEP latencies was poor, and in some cases responses could not be obtained. In the study of women with multiple sclerosis, prolonged central conduction times were found, along with many cases of unevokable responses, and a poor correlation of MEPs to urodynamic findings. The problems of obtaining selective recordings from the inaccessible pelvic floor musculature are discussed, and possible sources of variability in MEPs from the pelvic floor are considered. By relating the findings in the present studies to those of others using different modalities, some reflections are presented on the nature of the neural pathways to the pelvic floor activated by magnetic stimulation. As unevokable responses from the pelvic floor were an occasional finding among the healthy women, it is argued that a pelvic floor non-response in a patient with suspected corticospinal lesion should be interpreted with care, and should not carry the same clinical significance as an absent limb response. The inherent limitations of pelvic floor MEPs are discussed, and it is concluded that while there seems to be only limited clinical value of pelvic floor MEP testing, there might be some interesting scientific perspectives in studies that aim to control and explain the variability of responses.

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