

Transcranial Magnetic Stimulation (TMS) brain mapping of the hand motor area: comparison between healthy subjects and patients with cervical myelopathy

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Introduction

Many pioneering studies have investigated the effect of laterality on the cortical representation of the hand using TMS with incongruent results. Recently, the interest has shifted mainly to understanding cortical reorganization due to lesions at the central and peripheral level.

We investigated: i) the effect of laterality on the cortical representation of the dominant and non-dominant hand by comparing the intensity of stimulation, cortical area, and latencies obtained with TMS ii) and assessing the differences between healthy subjects and patients with cervical myelopathy.

Méthode

2-groups comparison Patients with cervical myelopathy (MP) vs. Healthy Subjects (HS). TMS mapping were performed in 26 HS and 13 MP. The intensity of stimulation, coordinates and latencies of significant stimulation points obtained by the abductor pollicis brevis et abductor digiti mini stimulation were recorded and analyzed.

Résultats

No significant difference was found for the three parameters studied between dominant and non- dominant hand within the two populations and by mixing them. By comparing the two populations (MS-vs- AP) we found a 10%, 12% and 51.5% increase in intensity of stimulation, maximal latency and cortical area, respectively in MP, compared with HS. The cortical representation showed a posterior shift in the axial plane for MP versus HS.

Conclusion

By using TMS, we showed that in patients with cervical myelopathy there is an adaptation of the cortical organization of the hand motor area. This is accompanied by increased stimulation intensities and latencies, and larger cortical areas. These results support the clinical relevance of TMS to characterize possible reorganization at the brain level in patients with chronic spinal cord impairment.