

MOTOR CORTEX STIMULATION FOR POST-AMPUTATION PAIN CONTROL.

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Objectives: Chronic motor cortex stimulation (CMCS) for severe neuropathic pain is considered as a beneficial alternative. More data have been reported for trigeminal and central pain. The objectives of this prospective study were: 1) to establish the long-term efficacy of CMCS for the control of phantom and stump pain, sequel of limb amputation. 2) to assess correlation between pain relief, electrode placement and functional imaging studies.

Material and Methods: Seven patients with phantom and/or stump pain, refractory to multiple treatment strategies, were selected. Motor cortex target was defined by pre-operative fMRI activation (movement of the stump and "virtual" movement of the phantom) fused to 3D neuronavigation sequences. The position of the central sulcus was established with intra-operative median nerve somatosensory evoked potentials. The somatotopic organization was confirmed by transdural motor cortex stimulation (stump motor response). Analgesic effects were assessed by means 11-point numerical rating pain scale (NRS), quality of life evaluation (Wisconsin questionnaire) and by a medication quantification scale (MQS).

Results: All patients obtained initial improvement in phantom and stump pain. The median follow-up after CMCS was: 41 months (range: 6 to 62 months). Long-term follow-up was considered good and excellent for 4 patients, significant for 2 and failure for 1 patient. Post-operative imaging (volumetric MRI of CTscan fused to pre-operative fMRI) coupled with motor threshold stimulation have determined the anatomical position of the quadripolar electrode and confirmed the correlation beneficial effects and electrode positioning overlying the pain target.

Conclusions: In the context of phantom limb pain, the difficulty in identifying the appropriate cortical area may be compounded by the cortical reorganization observed in amputated patients. Data from fMRI can be used to evaluate phantom limb virtual movements and precise the target. Correct positioning of the electrode optimise immediate and long-term pain relief. CMCS do not induce paresthesia: a randomised (on/off) double-blind controlled trial is now in progress.