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Information flow processing in migraine with aura: a study of effective connectivity in the EEG beta band during intermittent photic stimulation

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Objectives: The aim of the study was to evaluate phase synchronization and Granger causality of on-going EEG rhythm during repetitive photic stimulation in the interictal phase of migraine patients with and without aura compared to non-migraine controls.

Methods: EEG was recorded by six scalp electrodes from 19 migraine patients without aura (MO), 19 migraine patients with aura (MA) and 11 healthy subjects. Flash stimuli were presented at 9-27Hz frequencies. Phase synchronization based on the Hilbert transform and Granger causality was evaluated filtering the EEG in the alpha and beta bands.

Results: The pattern of alpha band hyper-synchronization in presence of flash stimuli was confirmed for migraineurs without aura, while MA showed desynchronization in the beta band and increased Granger causality during intermittent photic stimulation, compared to both MO patients and controls.

Discussion: Clear differences in on-going EEG under visual stimulation emerged between the two forms of migraine, probably subtended by increased cortical activation in MA and compensatory phenomena of reduced connectivity and functional networks segregation occurring in patients not experiencing aura symptoms.

Significance: Further evidences are needed to confirm if the differences in neuronal synchronization and causality patterns between the two forms of migraine may explain phenomena underlying the perception of aura symptoms.

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The trigger points dry needling and injection technique under ultrasound guidance for shoulder myofascial pain treatment. A comparative study

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Introduction: The issue of myofascial trigger points (MTrP) adequate inactivation is a challenging task. Discussion between efficiency of wet and dry needling remains unfinished.

Materials and methods: 44 patients with shoulder myofascial pain were randomly assigned to MTrPs dry needling (Group A, 22 patients) and to MTrPs injection treatment (Group B, 22 patients) under ultrasound guidance. Ultrasound was performed to identify MTrPs, as areas of muscle structure violation. In group A dry needling using 28gauge needles was performed, in group B the local anaesthetic was injected directly to MTrP. Visual analogue scale (VAS) data were measured before, immediately after, 24 hours and 7 days after the procedure in all patients. We evaluated local twitch response (LTR) eliciting, intramanipulation soreness, pain and trigger points (spasticity) recurrence after 24 hours and 7 days.

Results: The pain level had improvement from 7.5 to 1.1 (VAS 0 to 10) at 24 hours after procedure at group A compared to 7.4 to 4.2 in group B ($p < 0.001$). LTR was elicited in 100 % in group A compared to 14 % in group B ($p < 0.001$). There were registered significant correlations in two groups between level of eliciting, intramanipulation soreness and the pain relief effect. Pain and trigger point recurrence was significantly lower in group A.

Conclusion: MTrPs dry needling is preferred over injection treatment if reliable ultrasound guidance is provided, has significantly higher pain relief and lower pain and spasticity recurrence at 24 hours after first procedure and better long-term outcome.