



# Excitability of the motor cortex in migraine changes with the distance from the last attack



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## BACKGROUND

Single-pulse Transcranial magnetic stimulation studies of motor cortex have the advantage of relying on an objective measure, the motor evoked potential (MEP) recorded in peripheral muscles, to non-invasively explore the cortical excitability.

Previously, thresholds for MEP were found to be *normal, increased* or even *decreased* in migraine (see Coppola et al., 2007 for a review).

In the present study, we investigated whether level of cortical excitability changes with the distance from the last migraine attack could explain these inconsistent results.

## DESIGN & METHODS

Twenty-six patients with untreated migraine without aura (MO) underwent MEP study between attacks and were compared to a group of 24 healthy volunteers (HV).

The TMS figure-of-eight coil was positioned over the left motor area.

We first identified the resting motor threshold (RMT) and then amplitude of MEP was evaluated by delivering and averaging 10 single pulses of TMS using a stimulus intensity of 120% RMT at a rate of 0.1 Hz.

We took information on various patient clinical characteristics by collecting 1-month headache diary at the time of either the screening visit and the day of the recording session: duration of the migraine disease (years), attacks frequency (n/month), attacks duration (hours), severity of headache attacks (0-10), and days elapsed from the last migraine attack (n).

## RESULTS

Mean RMTs (54.2% in MO vs. 55.8% in HV) and MEP amplitudes (3057  $\mu$ V in MO vs. 3675  $\mu$ V in HV) were not significantly different between MO and HV.

In MO, the RMT negatively correlated with days elapsed since the last migraine attack ( $r = -0.426$ ,  $p = 0.03$ ).

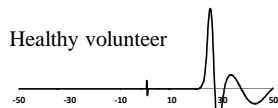
## DISCUSSION

From the present data emerges that the threshold for evoking MEP is influenced by the proximity of an attack since it is minimal at a long time interval after an attack while it is greater and within the range of normative values approaching to an attack. The dynamic RMT variations found here resemble those we have previously reported for visual and somatosensory evoked potentials, and may represent time-dependent plastic changes in brain excitability in relation with the migraine cycle.

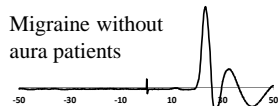
### Procedure

1. Resting motor threshold (RMT)
2. Amplitude of the motor evoked potential (MEP)

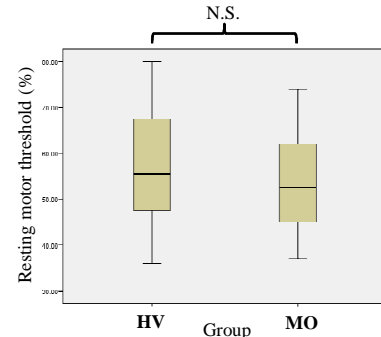
Healthy volunteer



Migraine without aura patients

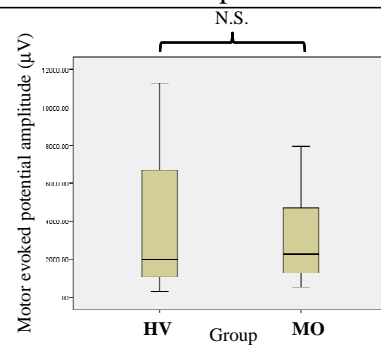


### Resting motor threshold



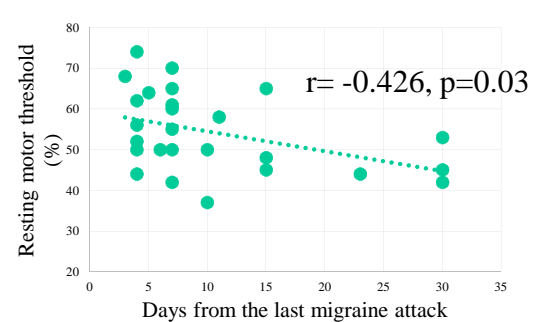
Resting motor threshold (RMT) were not significantly different between groups.

### MEP amplitude

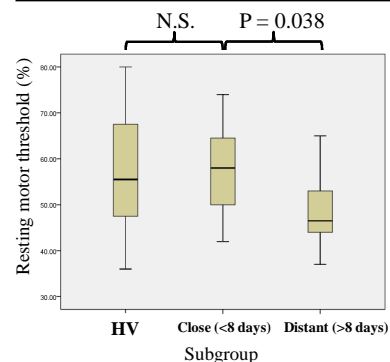


Motor evoked potential (MEP) amplitude were not significantly different between groups.

### Correlation



### Subgroup analysis



## REFERENCES

- Coppola G, Pierelli F, Schoenen J. Is the cerebral cortex hyperexcitable or hyperresponsive in migraine? Cephalalgia 2007; 27:1427-39.