

RELATIONSHIP BETWEEN PAIN PROCESSING AND THALAMOCORTICAL ACTIVITY: A STUDY OF HIGH-FREQUENCY SOMATOSENSORY OSCILLATIONS AND PRESSURE PAIN THRESHOLD

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Background. It has been hypothesised that the thalamocortical network plays an important role in processing and integrating nociceptive information from the cranial meninges with sensory information from the skull and pericranial tissues. To test this hypothesis, we investigated whether thalamocortical activity levels correlate with pressure pain thresholds (PPTs) in cranial and pericranial muscles in patients with episodic migraine without aura (MO). Somatosensory evoked potentials (SSEPs) were recorded during the interictal period, and subjective pressure pain sensitivity was quantified using an algometer.

Methods. Twenty-three patients with MO and 29 healthy subjects (HS) underwent SSEP recording after median nerve stimulation at the wrist. During the same session, PPTs were assessed in all participants using a digital algometer at six bilateral sites: the frontal, temporal, masseter, semispinalis capitis, sternocleidomastoid, and trapezius muscles. After digital filtering, we analysed the amplitudes of pre-synaptic (reflecting thalamocortical activation) and post-synaptic (reflecting primary cortical activation) high-frequency oscillatory (HFO) SSEP activity.

Results. Compared with HS, patients showed lower PPTs in all muscles bilaterally, except the trapezius, as well as reduced thalamocortical high-frequency activity and habituation. In HS, HFO cortical activity correlated positively with PPTs in the right semispinalis capitis and left sternocleidomastoid muscles. In the same group, habituation correlated negatively with PPTs in the left masseter and sternocleidomastoid muscles. By contrast, no significant correlations were found in patients with MO.

Conclusions. Our results suggest that, in both HS and patients with MO, HFO thalamocortical drive does not contribute to pressure pain sensitivity in cranial and pericranial muscles. Primary cortical activation and habituation appear to influence PPT levels in HS, but not in patients with migraine during the pain-free phase.