



Absence of cortical thickening in migraine patients as compared to controls

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Purpose

Migraine headache is presumably experienced through nociceptive inputs to the somatosensory cortex (SSC). A prior report¹ in a small cohort (24 patients with migraine, 12 controls) suggested that the SSC was thicker in patients with migraine compared to control.

We attempted to replicate this observation in a larger population.

Methods

Subjects: 84 subjects from three groups were studied: migraine with aura (MWA, 4 m/24 f, age 35 yrs \pm 6 SD), migraine without aura (MWoA, 4 m/24 fe, age 35 yrs \pm 7 SD), and headache-free controls (Controls, 4 m/24 f, age 33 yrs \pm 6 SD).

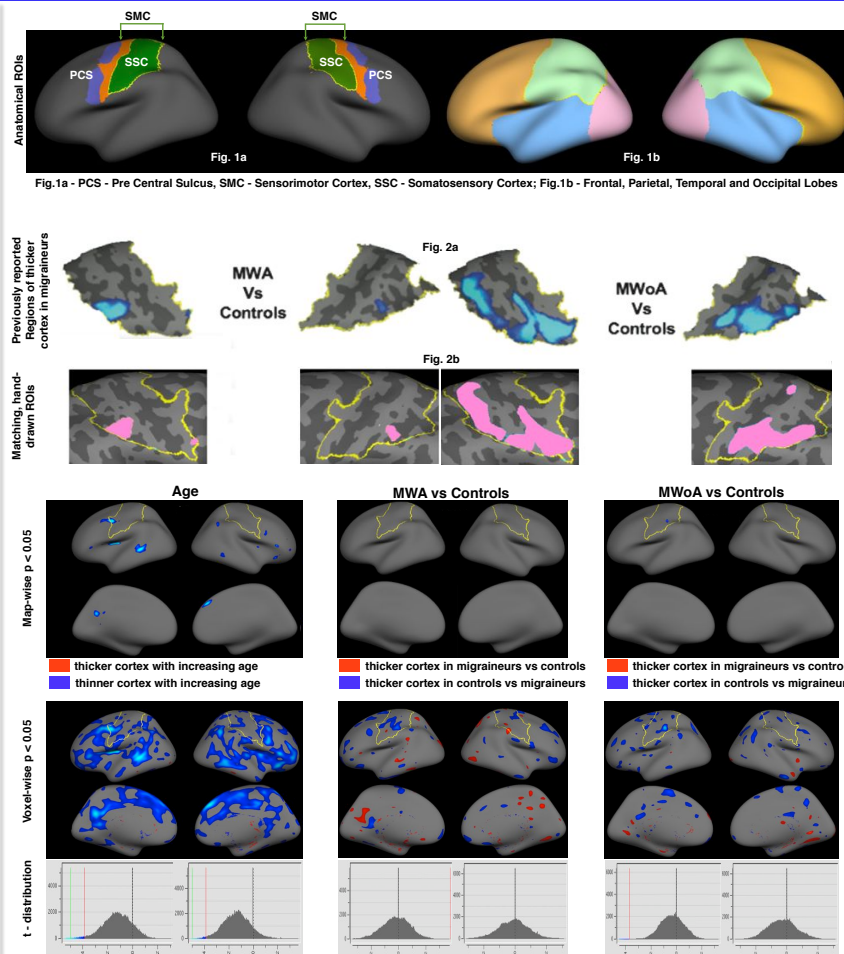
Data Acquisition: For each subject, a 1 mm³ MPAGE image was collected at 3T using an 8-channel head coil.

Data Processing: FreeSurfer was used to segment each MPAGE image, reconstruct and inflate the cortical sheet, and estimate gray matter thickness per vertex.² Thickness measures were mapped onto each subject's inflated surface, aligned to a common average brain using spherical registration, and smoothed with a 10 mm FWHM kernel.

Analyses: The mean cortical thickness was obtained for each subject in each of the 8 different regions of interests (ROIs) (Fig 1). Two specific ROIs were hand drawn (Fig. 2b) to match the regions of thicker cortex reported by DaSilva et. al.¹ (Fig. 2a).

Population differences in thickness were compared in an ANOVA that included age and gender factors.

Whole brain random-effects models tested for group differences in cortical thickness at each vertex. Additional covariates modeled the effects of age and gender. Permutation analyses were used to determine map-wise thresholds.



Results

For each ROI, the mean cortical thickness measurements across the three groups were non-significant.

In the hand-drawn ROI matching the regions of thicker cortex in MWA vs Controls (DaSilva et al), both ANOVA and permutation analysis reveal that controls have a significantly thicker cortex than migraine without aura patients ($p < 0.002$).

There were no significant differences between the groups at the whole-brain level.

Conclusions

In contrast to a prior report, we found no evidence of a thicker SSC in migraine patients compared to controls. Our study included a larger sample of patients, but subjects were otherwise similar to those in the prior report.

If anything, there was a trend towards controls having thicker cortex than migraineurs.

We did identify a clear relationship between increasing age and decreased cortical thickness. This is consistent with prior studies³ and provides a positive control.

References

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