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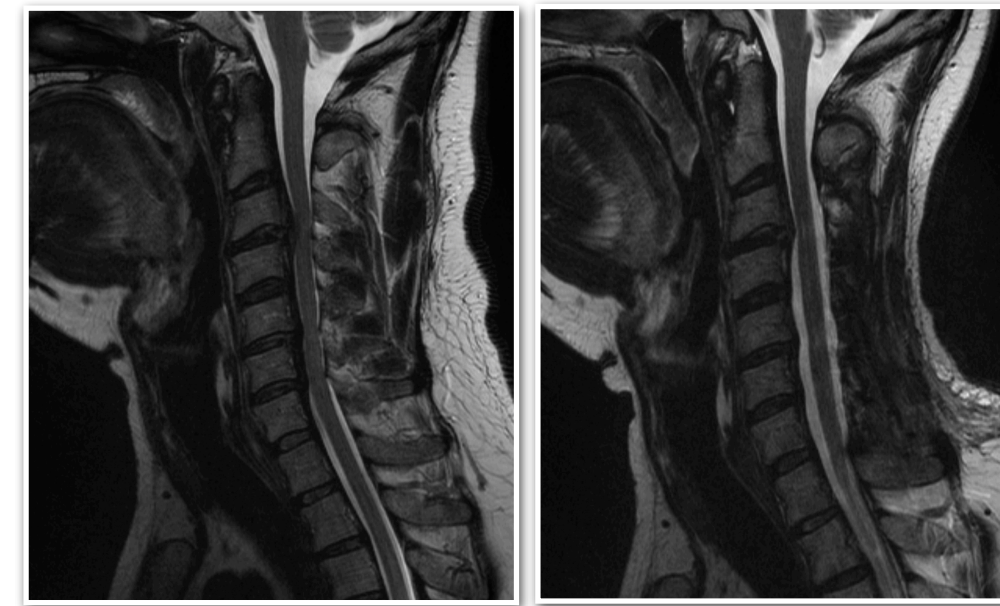
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Introduction

Cervical spondylosis (CS) is a progressive degenerative condition in which the cervical spinal cord becomes compressed leading to chronic neck pain. Studies have demonstrated that CS patients undergo cerebral alterations, yet sex-related cortical differences remain unknown. Sex-related morphological alterations have been observed in other chronic pain disorders including IBS and migraine.



Preoperative Postoperative
Figure 1: Patient with cervical stenosis T2-weighted MRI of patient with CS. (Left) preoperative image demonstrating spinal cord compression. (Right) postoperative image demonstrating spinal cord decompression following C3-7 laminoplasty.

We hypothesize patients with cervical spondylosis will exhibit sex differences in cortical thickness and volume in sensorimotor and pain related regions.

Methods

Sex (Male/Female)	Asymptotic/Symptomatic	Age (Mean +/- SD)	NDI (Mean +/- SD)
86 (52/34)	(19/34)	58.5 +/- 11.3	12.6 +/- 9.4

T1-weighted structural MRIs were acquired on a 3T scanner using a MP-RAGE sequence, a TR=2300-2500ms, TE=2-3ms, TI=900-945ms, flip angle=9°, and 1mm³ isotropic voxel size. The Neck Disability Index (NDI) questionnaire was used to measure the severity of disability due to neck pain (0-4=no disability, 5-14=mild, 15-24=moderate, 25-34=severe, 35-50=complete disability). FreeSurfer was used to perform morphometric analyses. Significance was set at $p < 0.05$ with a FDR of 0.05.

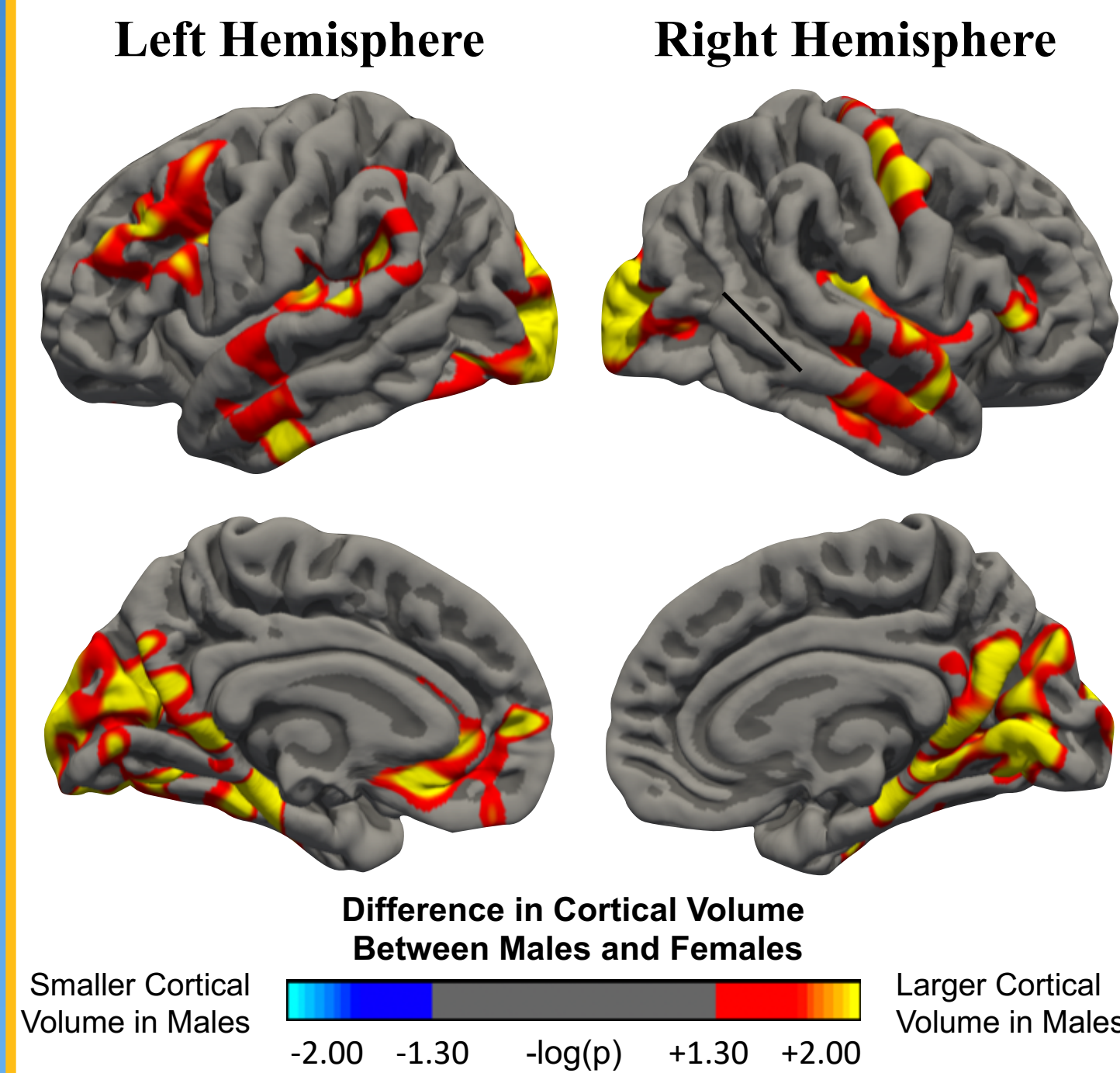


Figure 2: Sex-related differences within patients

Compared to female patients, male patients exhibited significantly thicker cortex in the *left* precuneus and larger cortical volume in the (*left*) lingual gyrus, superior frontal gyrus, superior temporal gyrus, rostral middle frontal gyrus, and the (*right*) lateral occipital cortex, parahippocampal gyrus, insular cortex, and precentral gyrus.

Funding Source: NIH/NINDS 2R01NS078494-06

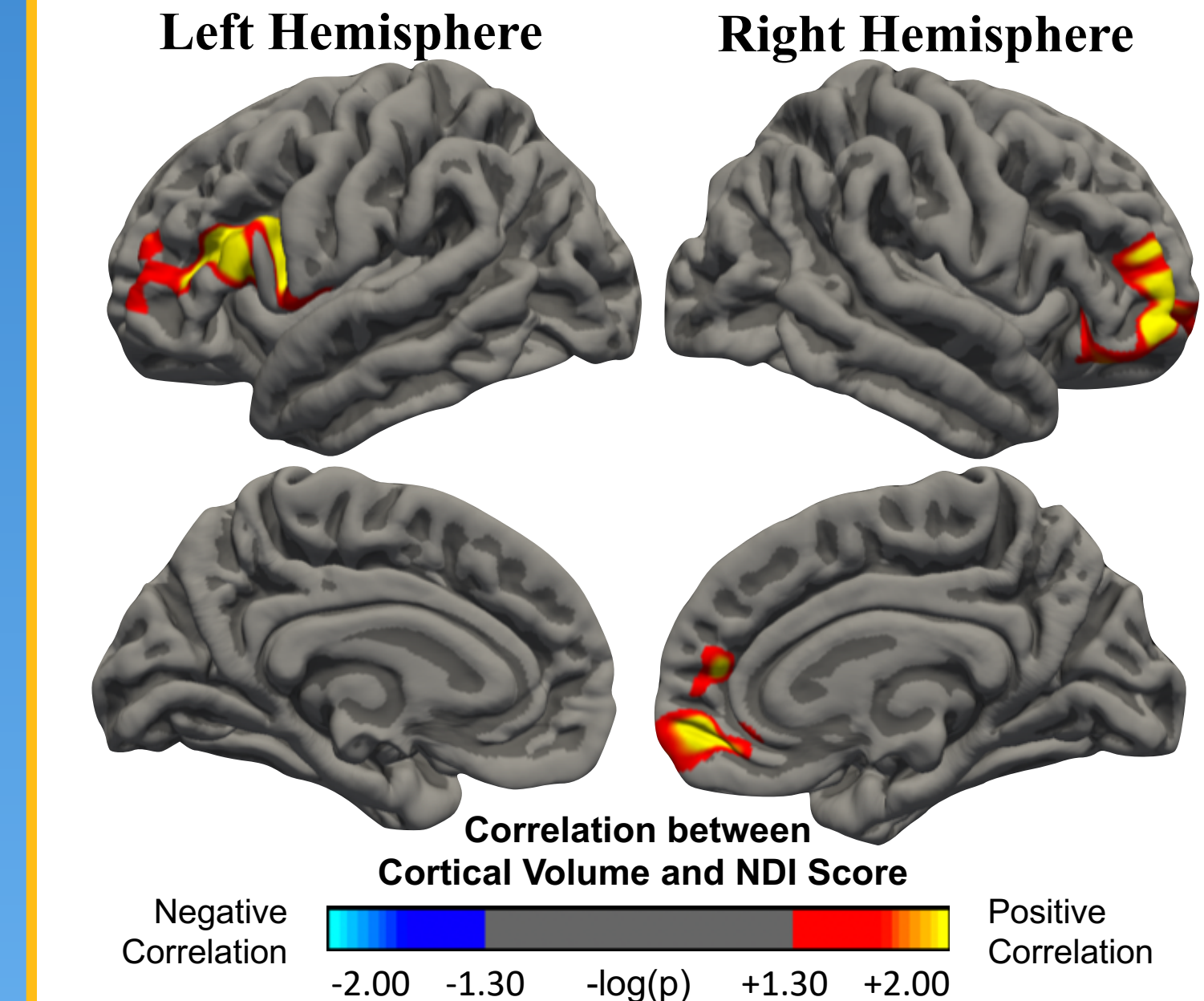


Figure 3: Interaction between sex and NDI score

Male patients exhibited a greater positive correlation between cortical volume and NDI score in the *left* pars opercularis and the *right* pars orbitalis compared to female patients.

Conclusion

In patients with cervical spondylosis, with or without myelopathy, we observed sex-dependent cortical alterations in regions known to be involved in pain processing. Furthermore, males displayed a greater positive correlation between cortical volume and NDI in the pars opercularis and pars orbitalis suggesting that sex-dependent morphometric changes may be related to symptom severity.