Neuropsychology Abstracts

Title: LANGUAGE PROFILES IN CHILDREN WITH SPINA BIFIDA: AN MEG STUDY

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Background: Behavioral studies of children with spina bifida (SB) have documented abnormalities in language function, though the neural mechanisms underlying impaired linguistic processing in these individuals is unclear. Using magnetoencephalography (MEG), we have previously established normative language-specific brain activation profiles in typically developing children, characterized by consistent activity in perisylvian regions and lateralized to the left middle temporal gyrus (MTG). Here, we used validated MEG language mapping protocols to investigate activation profiles for receptive language and phonological decoding in children with SB, relative to neurologically intact children.

Method: MEG recordings of language-specific brain activity were obtained in children with SB and controls, in the context of two experiments. In the first experiment, receptive language function was investigated by asking participants (24 controls and 23 SB) to perform an auditory word recognition task. During the second experiment, phonological decoding ability was studied while 18 control and 18 SB children executed a pseudoword reading task.

Results: Activation of perisylvian regions, including leftward asymmetry of the MTG, was present in children with SB and controls during auditory word recognition. During pseudoword reading, a significant difference ($P = 0.037$) in activation profiles was found such that controls exhibited greater engagement of the left visual cortex, compared to children with SB. Additionally, a significant difference ($P = 0.027$) in asymmetry of the MTG was present during pseudoword reading such that controls displayed leftward asymmetry of this region, whereas children with SB exhibited rightward asymmetry.

Conclusion: The tendency for reversed MTG asymmetry during phonological decoding exhibited by SB children may underlie core linguistic deficits manifest in this population. Furthermore, reduction in the degree of left visual cortex activity during phonological decoding may parallel altered cortical morphology along a posterior-anterior gradient previously reported in children with SB.