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Abstract

BACKGROUND: Music is one of the most sophisticated and fascinating functions of the brain. Yet, how music is instantiated within the brain is not fully characterized. Singing is a peculiar aspect of music, in which both musical and linguistic skills are required to provide a merged vocal output. Identifying the neural correlates of this process is relevant for both clinical and research purposes.

CASE DESCRIPTION: An adult white man with a presumed left temporal glioma was studied. He is a professional opera singer. A tailored music evaluation, the Montreal Battery of Evaluation of Amusia, was performed preoperatively and postoperatively, with long-term follow-up. Intraoperative stimulation mapping (ISM) with awake surgery with a specific music evaluation battery was used to identify and preserve the cortical and subcortical structures subserving music, along with standard motor-sensory and language mapping. A total resection of a grade I glioma was achieved. The Montreal Battery of Evaluation of Amusia reported an improvement in musical scores after the surgery. ISM consistently elicited several types of errors in the superior temporal gyrus and, to a lesser extent, in the inferior frontal operculum. Most errors occurred during score reading; fewer errors were elicited during the assessment of rhythm. No spontaneous errors were recorded. These areas did not overlap with eloquent sites for counting or naming.

CONCLUSIONS: ISM and a tailored music battery enabled better characterization of a specific network within the brain subserving score reading independently from speech with long-term clinical impact.

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KEYWORDS: Brain; Glioma; Intraoperative stimulation mapping; Music

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