

Language lateralization

[Language](#) lateralization refers to the phenomenon in which one hemisphere (typically the left) shows greater involvement in language functions than the other.

Quinones et al. investigated changes in [language lateralization](#) between 2 fMRI studies in patients with [brain tumors](#) to elucidate factors contributing to [cortical remapping](#).

The authors analyzed 33 patients with [brain tumors](#) involving eloquent [language areas](#) who underwent 2 separate presurgical, language task-based fMRI examinations (fMRI1 and fMRI2). Pathology consisted of [low-grade glioma](#) (LGG) in 15, and [high-grade glioma](#) (HGG) in 18. The mean time interval between scans was 35 ± 38 months (mean \pm SD). Regions of interest were drawn for [Broca's area](#) (BA) and the contralateral BA homolog. The laterality index (LI) was calculated and categorized as follows: > 0.2 , left dominance; 0.2 to -0.2 , codominance; and < -0.2 , right dominance. Translocation of [language function](#) was defined as a shift across one of these thresholds between the 2 scans. Comparisons between the 2 groups, translocation of language function (reorganized group) versus no translocation (constant group), were performed using the Mann-Whitney U-test.

Nine (27%) of 33 patients demonstrated translocation of language function. Eight of 9 patients with translocation had tumor involvement of BA, compared to 5/24 patients without translocation ($p < 0.0001$). There was no difference in LI between the 2 groups at fMRI1. However, the reorganized group showed a decreased LI at fMRI2 compared to the constant group (-0.1 vs 0.53 , $p < 0.01$). The reorganized cohort showed a significant difference between LI1 and LI2 (0.50 vs -0.1 , $p < 0.0001$) whereas the constant cohort did not. A longer time interval was found in the reorganized group between fMRI1 and fMRI2 for patients with LGG (34 vs 107 months, $p < 0.002$). Additionally, the reorganized cohort had a greater proportion of local tumor invasion into eloquent areas at fMRI2 than the constant group. Aphasia was present following fMRI2 in 13/24 (54%) patients who did not exhibit translocation, compared to 2/9 (22%) patients who showed translocation.

[Translocation](#) of [language function](#) in patients with a [brain tumor](#) is associated with tumor involvement of BA, longer time intervals between scans, and is seen in both LGG and HGG. The reduced incidence of [aphasia](#) in the reorganized group raises the possibility that [reorganization](#) supports the conservation of language function. Therefore, longitudinal fMRI is useful because it may point to reorganization and could affect therapeutic [planning](#) for patients ¹⁾.

1)

Quinones A, Jenabi M, Pasquini L, Peck KK, Moss NS, Brennan C, Tabar V, Holodny A. Use of longitudinal functional MRI to demonstrate translocation of language function in patients with brain tumors. J Neurosurg. 2022 Nov 25:1-9. doi: 10.3171/2022.10.JNS221212. Epub ahead of print. PMID: 36433876.

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