Normal and abnormal fMRI activation patterns in the visual cortex after recovery from optic neuritis

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Abstract:

Recovery to normal or near normal visual acuity after an optic neuritis episode is common, despite frequent persistence of conduction abnormalities, evident in prolonged visual evoked potential (VEP) latencies. Improvement of visual function is commonly attributed to peripheral nerve recovery. However, central reorganization processes may also be involved. To assess this, we compared the patterns of fMRI activation, elicited by stimulation of the affected and the normal eye, along the visual cortical hierarchy. Activation was assessed in 8 subjects, which recovered clinically from an episode of optic neuritis but still had prolonged VEP latencies. In all patients, reduced fMRI activation was seen in V1 during stimulation of the affected eye, compared to the normal eye. The fMRI signal difference decreased in magnitude with progression along the visual hierarchy, and in some regions within the lateral occipital complex even showed the opposite preference (for the affected eye). These results may indicate a built-in robustness of the object-related areas to disruption of the visual input. Alternatively, it could reflect an adaptive functional reorganization of the cortical response to an abnormal input.

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