White matter integrity in patients with spider phobia

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Abstract:
Spider phobia is characterized by excessive and unreasonable fear and avoidance-behaviour when exposed to a phobic stimulus. Previous research suggests that visually elicited phobic reactions deactivate prefrontal areas involved in cognitive control over emotion-triggering areas like the amygdala. The fear mechanisms in specific phobias could be explained by microstructural abnormalities in white matter integrity and may contribute to the understanding of the occurrence of irrational anxiety symptoms. A diffusion tensor imaging (DTI) sequence was used to acquire images in 30 patients with spider phobia and 30 matched healthy control subjects. This study assess whether spider phobic patients show abnormalities in association with white matter fiber tracts compared to healthy controls. Mean diffusivity (MD) is a directionally averaged measure of diffusion; whereas, fractional anisotropy (FA) is a measure of how much the diffusion tensor deviates from the isotropic form (diffusion occurs equally in all directions). These measures are compared to specify regions of interest and investigate structural connectivity. Combining fMRI and DTI, the neuronal activation of the fear-related brain areas are used as seed points for probabilistic fiber tractography.