

BRAIN WATER DIFFUSION CHANGES IN ADOLESCENT GIRLS WITH ANOREXIA NERVOSA

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Introduction: We previously found adolescent girls with anorexia nervosa (AN) to have widespread reductions in grey matter (GM) volumes. After weight recovery, GM volume recovered in the prefrontal, insular, mid- and posterior cingulate cortices, left hippocampus and in the right anterior thalamus. In this study, we aimed to extend these findings by exploring changes in free-water diffusion using Diffusion Tensor Imaging (DTI) as a marker of neuroanatomical change. Method: A set of DTI brain scans (32 directions, 2x2x2.5mm voxels) were acquired in 26 underweight AN, 20 healthy controls (HC) and in 10 AN after weight recovery. Mean diffusivity (MD) brain maps were calculated and normalized to the Montreal Neurological Institute template and smoothed (6mm). Differences in MD between AN pre- and post-weight recovery were determined using a two-sample, random effects, voxel-by-voxel analysis ($p < 0.05$, corrected). Results: All underweight AN had increased MD in frontal, temporal, parietal and occipital cortices and in the caudate nuclei, corpus callosum and fornix. After weight recovery, MD decreased and begins to normalize towards HC. Conclusion: Water diffusivity changes in MD improve after weight recovery and may indicate a possible mechanism explaining psychological and cognitive improvements seen in AN with treatment.