

CANNABIS USE AND CORPUS CALLOSUM (CC) MICROSTRUCTURAL INTEGRITY IN PATIENTS WITH FIRST EPISODE PSYCHOSIS: A DIFFUSION-TENSOR IMAGING (DTI)-TRACTOGRAPHY STUDY

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Introduction: The impact of cannabis use on brain structure, particularly white matter (WM), is poorly understood. The CC is the largest WM structure in the brain. Abnormalities revealed in the CC may underlie functional anomalies of cannabis use. This is the largest study to explore the effect of cannabis on callosal WM connectivity among first episode psychosis (FEP) and controls.

Objectives: To investigate the relationship between cannabis use and WM micro-structural integrity of the CC, in FEP and healthy controls.

Methods: We evaluated 56 FEP patients (67% current cannabis users), and 43 healthy controls (44% current cannabis users). We used Diffusion Tensor Imaging combined with a WM mapping-tractography technique to investigate the microstructural integrity of the CC.

Results: Total CC Fractional anisotropy (FA) was lower in patients than controls ($p=0.05$). Cannabis-using patients had lower FA of the total CC than cannabis-using controls ($p=0.04$). There were no differences in FA between cannabis-using patients and those who had never used. However, cannabis-using patients had higher mean diffusivity (MD) of total CC ($p=0.02$), Rostral-Body ($p=0.003$), Anterior Mid-Body ($p=0.03$) and the Splenium ($p=0.06$) than patients who never used cannabis. There were no differences in MD between patient users who started before the age of 16 and those who started later.

Conclusion: Cannabis is associated with a significant effect on callosal WM integrity only in patients with psychosis. Disturbed callosal connectivity may explain some of the abnormalities with regard to the functional and clinical outcomes in FEP cannabis users, including measures of cognitive impairment.