

# Diffusion tensor imaging findings in early-onset schizophrenia (EOS) patients

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NO POTENTIAL CONFLICT OF INTEREST



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## INTRODUCTION:

### What is a role of white matter in schizophrenia?

- Schizophrenia is conceived mostly as a disorder of connectivity between components of large-scale brain networks
- Abnormalities of white matter (WM) in schizophrenia are confirmed by postmortem, genetic and DTI studies [1].
- Diffusion tensor imaging (DTI) is a non-invasive neuroimaging method which enables to detect even slight structural abnormalities in the WM nerve fibers [2].
- Most DTI studies confirm WM structural abnormalities in the chronic schizophrenia patients
- Sparse data obtained in EOS group of patients confirm a presence of widespread and not totally consistent WM abnormalities [3].

## PURPOSE OF THE STUDY:

Examination of structural abnormalities in WM integrity of the multiple brain regions in a group of early-onset (EOS) and relatively short duration of symptoms schizophrenia patients compared to healthy controls – using diffusion tensor imaging (DTI).

## METHODS:

30 patients (15 males and 15 females) with diagnosis of EOS and 30 healthy comparison subject participated in the DTI study (1.5T General Electric SIGNA HDi System).

Demographic characteristics of both groups, including age, sex, handedness were comparable. The mean duration of illness in the patients was (mean/sd) 4,2/2,40 years.

The differences between means within and between groups were checked by an analysis of variance (ANOVA) conducted for each of ROIs' FA values.

## RESULTS:

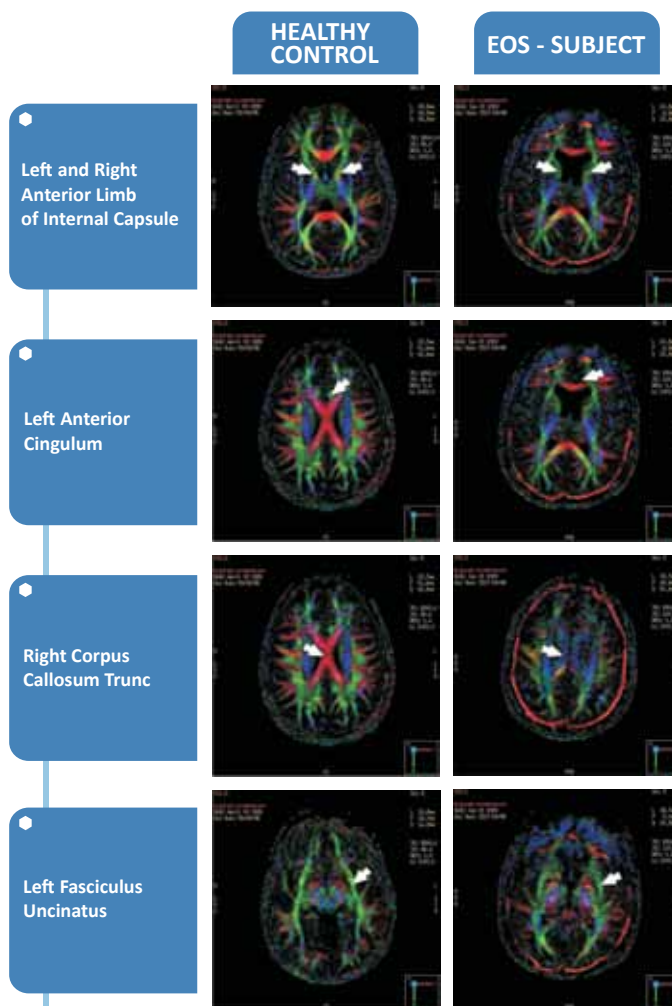
ROI	Mean FA		SD		ANOVA	ETA-Squared
	Patients	Controls	Patients	Controls		
Left Anterior Limb of Internal Capsule	0.455	0.485	0.065	0.051	sig = 0.053*, df=1, F=3.901	0.063
Right Anterior Limb of Internal Capsule	0.471	0.508	0.067	0.045	sig=0.016*, df=1, F=6.143	0.096
Left Anterior Cingulum	0.295	0.328	0.054	0.055	sig=0.022*, df=1, F=5.560	0.087
Right Corpus Callosum trunc	0.631	0.675	0.089	0.064	sig=0.033*, df=1, F=4.778	0.076
Left Fasciculus Uncinatus	0.410	0.439	0.050	0.053	sig=0.032*, df=1, F=4.846	0.077

\*Significance values for ANOVA <0.05

## CONCLUSION:

### WM integrity is suggested to be essential in manifestation of schizophrenia symptoms

- Our data confirmed decreased FA in early-onset schizophrenia patients, compared to controls, in the widespread white matter areas observed at the relatively early stage of the disease.
- To establish a possible neurodevelopmental predisposition to develop psychotic symptoms the further research in first-episode schizophrenia patients would be essential.



FA directionally encoded color (DEC) maps of control subject and EOS subject with extreme FA values. Arrows point regions of significantly lower FA values in EOS subjects compared to controls.

## REFERENCES:

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2. Taylor WD, Hsu E, Krishnan KR, MacFall JR. Diffusion tensor imaging: background, potential, and utility in psychiatric research. *Biol Psychiatry* 2004; 55(3):201-207.
3. Ellison-Wright I, Bullmore E. Meta-analysis of diffusion tensor imaging studies in schizophrenia. *Schizophr Res* 2009; 108(1-3):3-10.