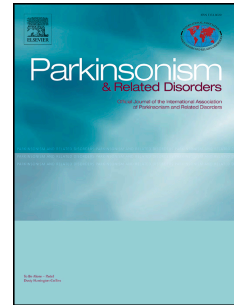


# Accepted Manuscript

Impact of Parkinson's disease and levodopa on resting state functional connectivity related to speech prosody control Rektorova Irena 07/12/2015 8:30:00 AM 10.00 PARALLEL SESSION 2.20 ADVANCES IN PD IMAGING (1) 9:30 10:00 Functional connectivity

Nela Elfmarková, Martin Gajdoš, Martina Mračková, Jiří Mekyska, Michal Mikl, Professor Irena Rektorová, MD, Ph.D.



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**Impact of Parkinson's disease and levodopa on resting state functional connectivity related to speech prosody control****Rektorova Irena 07/12/2015 8:30:00 AM 10.00****PARALLEL SESSION 2.20 ADVANCES IN PD IMAGING (1)****9:30 10:00 Functional connectivity**

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**Abstract**

**Background:** Impaired speech prosody is common in Parkinson's disease (PD). We assessed the impact of PD and levodopa on MRI resting-state functional connectivity (rs-FC) underlying speech prosody control.

**Methods:** We studied 19 PD patients in the OFF and ON dopaminergic conditions and 15 age-matched healthy controls using functional MRI and seed partial least squares correlation (PLSC) analysis. In the PD group, we also correlated levodopa-induced rs-FC changes with the results of acoustic analysis.

**Results:** The PLSC analysis revealed a significant impact of PD but not of medication on the rs-FC strength of spatial correlation maps seeded by the anterior cingulate ( $p = 0.006$ ), the right orofacial primary sensorimotor cortex (OF\_SM1;  $p = 0.025$ ) and the right caudate head (CN;  $p = 0.047$ ). In the PD group, levodopa-induced changes in the CN and OF\_SM1 connectivity strengths were related to changes in speech prosody.

**Conclusions:** We demonstrated an impact of PD but not of levodopa on rs-FC within the brain networks related to speech prosody control. When only the PD patients were taken into account, the association between treatment-induced changes in speech prosody and changes in rs-FC within the associative striato-prefrontal and motor speech networks was found.

**Keywords**

Parkinson's disease, functional connectivity, speech prosody, fMRI, resting state, dopaminergic, levodopa, acoustic, motor speech network, caudate nucleus

**Running title**

Impact of PD and levodopa on rs-FC underlying speech prosody

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