

THE EFFECT OF BOTOX TREATMENT IN BLEPHAROSPASM - AN MRI PILOT STUDY

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The pathophysiology of the blepharospasm (BPS) and the central effect of botulinum-neurotoxin (BNT) are poorly understood. The basal ganglia-thalamocortical motor circuit is thought to have a role in BPS and we suppose that BTN might have an influence on it (Obermann et al., 2007; Suzuki et al., 2007; Zhou et al., 2013).

Ten BPS patients went under MRI scan before and after the regular BNT treatment. High resolution T1 weighted images, diffusion-weighted images and resting state functional MRI were done. The size, the structural and functional connectivity and diffusivity parameters of the basal ganglia were investigated with new MRI analytic methods.

After BNT treatment the size of the left thalamus decreased in the antero-lateral region ($p_{corr.}$ 0.0144). This affected region showed connection to the motor-premotor pathways, to the frontal cortex and to the cerebellum. No microstructural alterations of the white matter were found. Using the identified regions with tractography as seeds, functional connectivity analysis showed enhanced activity in the frontal lobe after BNT treatment. Also, the whole brain resting state functional MRI showed a partial restoration in visual component coherency (p 0.0266). Diffusivity parameters of the basal ganglia showed hemispheric differences after the BNT treatment.

Our study supports the hypothesis that BNT treatment could generate functional and structural changes in the brain. Furthermore these results also serve an evidence for the crucial role of the deep brain structures in the pathophysiology of the dystonia and suggest, that BNT has a central effect and might due to plastic changes.