

**What's Hot in Parkinson's Disease?
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**MRI and Deep Brain Stimulation Devices: Is it Safe to Have an MRI with a
DBS in Place?**

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There has been a great deal of recent controversy as to whether a MRI can be safely performed in Parkinson's disease patients (PD) with deep brain stimulator devices. The overarching worry has been that the MRI machines will heat the DBS, and this will in turn result in an irreversible injury to the brain. Despite these worries there have been surprisingly few cases of MRI-related heating injuries associated with DBS devices. In one case reported by Henderson, et. al., proper MRI guidelines were not adhered to, and thus the injury was preventable (the patient had an abdominally implanted battery pack and the MRI was of the spine and not the head) (Henderson, 2005). In the other case, a deep heating technique called diathermy was utilized, and the heat injury to the brain was therefore not MRI related (Nutt, 2001). The National Parkinson Foundation sought to more carefully examine the question of MRI safety in patients with DBS devices through a DBS working group.

You might ask, why is it necessary to obtain MRI imaging following a DBS operation? There are actually a number of important reasons including, but not limited to, 1- confirming the DBS lead(s) placement, 2- looking for strokes/other newly presenting neurological diseases, and 3- for re-operating/inserting more DBS leads. The use of MRI post-DBS has been recently examined by the FDA and certain precautions have been recommended in patients undergoing MRI (e.g. nothing stronger than a 1.5T magnet, a head/receive coil on the machine, no abdominally placed batteries, MRI's only of the head, etc.). Despite the published precautions and an expanding safety experience, radiologists at many institutions around the United States have become hesitant to image Parkinson's disease patients post-DBS. We sought to use the extensive network of NPF Centers of Excellence to examine the safety record.

Forty of 43 (95%) NPF Centers of Excellence completed a survey and 23 (58%) reported that they were currently performing brain MRI in DBS patients, while 3 (7.5%) had done it in the past. The 17 Centers of Excellence currently not performing post-operative MRI for DBS listed the following reasons: 1) industry guidelines and/or warnings (53%); 2) decision deferred to outside department (29%); 3) liability/risk/safety (18%); 4) no active DBS program (18%); 5) no available MRI (12%); and 6) insurance and reimbursement concerns (6%). A total of 3304 PD patients with one or more DBS leads had a brain MRI scan, and 177 DBS patients had a MRI of other body regions. In one case MRI was

associated with a DBS battery failure without neurological sequelae after battery replacement. No other complications were reported (Tagliati, 2009). Additionally, Larson et. al. has published a large experience in 405 patients without any adverse events from MRI scanning (Larson, 2008). We felt that this data in total provided evidence for a favorable risk/benefit ratio for brain MRI in patients with DBS implants. Our findings were published in the Journal NeuroImage, 2009.

Selected References:

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