

## A possible role of reward sensitivity and impulsivity in weight gain after deep brain stimulation.

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Deep brain stimulation of the subthalamic nucleus (STN-DBS) is safe procedure to treat Parkinson's disease (PD) that however may expose patients to non-motor effects [1]. In particular it has been shown that after the implant patients suddenly increase in weight. However, the exact mechanism of this weight gain has not yet been identified [2,3]. Since these changes seem to be modulated by STN-DBS [4-6], we aimed at evaluating the role of reward sensitivity and impulsivity in weight gain after DBS.

Patients with PD scheduled for STN-DBS were recruited. They were tested in a satiated state before surgery in on medication, and after surgery in on medication/off stimulation and on medication/on stimulation. All participants were asked to complete a self-report questionnaire about impulsiveness, a go-no-go experiment measuring the response inhibition to food items and finally, a task that evaluates hedonic and motivational aspects of food processing (liking and wanting, respectively). The preoperative and postoperative body weights were recorded. The mean body weight of patients increased postoperatively. Both reward sensitivity and impulsivity increased after surgery. The weight changes correlated positively with hedonic ratings of food items and salience/motivation towards foods in on medication/on stimulation, in particular for non-sweet foods (both high and low calorie foods). Moreover, weight changes correlated positively with false alarms for food items in the go no-go task in on medication/on stimulation. Finally, weight changes correlated negatively with motor impulsiveness in the pre surgical condition and positively with changes in motor impulsiveness after surgery. Our results confirm that STN-DBS expose patients to the risk of weight gain. Moreover, they suggest that postoperative weight gain may be related to changes in food reward sensitivity and in inhibitory control. Both these aspects have been recognized to play an important role in eating behaviors.

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