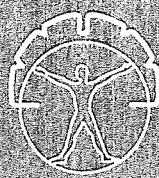


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**FINAL PROGRAM**

## 1202

### MER vs. MRI guidance in placement of DBS electrodes for Parkinson's disease

J. Jimenez-Shahed, M. York, E.M. Smith-Gloyd, J. Jankovic, A. Viswanathan (Houston, TX, USA)

**Objective:** To obtain pilot data comparing the safety and efficacy of deep brain stimulator (DBS) electrode implantation using MRI guidance to micro-electrode recording (MER) guidance in patients with Parkinson's disease (PD).

**Background:** New technology allows for accurate placement of DBS electrodes with image guidance, but the relative safety and efficacy of this technique compared to traditional MER-guidance has not been studied.

**Methods:** Patients with PD considered by consensus opinion to be candidates for DBS placement in the subthalamic nucleus (STN) or pallidum (GPi) were randomized to MER- vs MRI-guided procedures. Pre-operative motor score off medications was compared to post-operative on DBS/off medication score at ≥6months. Pre- and post-operative neuropsychological assessments, number of MER tracts or stylet passes, incidence of radiologically-apparent hemorrhage, and surgical complications were also compared. Post-operative neurology and neuropsychology raters were blinded to treatment assignment.

**Results:** 8 subjects (5M) were randomized: 5 bilateral STN, 2 bilateral GPi, and 1 unilateral GPi. In the MRI group (n=3, 5 electrodes), one stylet pass per implanted electrode was used compared to a mean of 2.3 tracts (range 2-4) per electrode in the MER group (n=5, 10 electrodes). In the MRI group, electrodes were implanted with a mean radial error of 0.6mm +/- 0.3mm, compared to 1.1 +/- 0.3mm in the MER group. No radiologically-apparent hemorrhages or surgical adverse events were recorded. 6 post-operative side effects related to DBS placement were reported in 4 MER subjects, vs. only 1 in the MRI group. 4/5 MER compared to 1/3 MRI subjects subjectively experienced a microlesion effect. 6 subjects (5M) completed some or all follow-up assessments (4 bilateral STN, 1 bilateral GPi, and 1 unilateral GPi). Baseline motor scores improved by 43.7%/-32.3% in the MRI group (n=2) and 33.7% in the MER group (n=2).

Neuropsychological assessment (n=5) did not reveal any significant differences between groups before or after surgery on cognitive screening or verbal fluency measures. No significant differences in depression or anxiety scores were revealed between groups.

**Conclusions:** This pilot study suggests MRI guidance for DBS electrode placement in patients with PD may be associated with fewer electrode passes and fewer post-operative side effects. Further study is warranted to verify these findings in a larger cohort of patients.

## 1203

### Investigation of deep brain stimulation surgery early term results of gait characteristics on Parkinson's disease: Case report

E. Kavlak, F. Altug, M. Pekesen, A. Ünal, Ö. Çeliker, U. Cavlak (Denizli, Turkey)

**Objective:** This study was carried out to examine the effect of the Subthalamic nucleus deep brain stimulation (STN-DBS) surgery on the characteristics of the gait.

**Background:** Deep brain stimulation (DBS) is an effective technique for treating Parkinson's disease (PD) and other movement disorders (essential tremor, etc.). The STN is the most common target for clinical treatment using DBS (1,2). STN-DBS has been established as a safe and has acquired a relevant role in the treatment of PD in the middle and advanced stages (1,2,3).

**Methods:** This study was conducted on 67 year-old man 3 years with Parkinson's disease and STN-DBS surgery. The gait parameters were evaluated by using foot print method. 6 Meter Walking Test was used to evaluate for walking speed rate. All assessments were made after surgery, before the battery is turned on and the battery is turned on after 12 hours.

**Results:** After opening the battery step length and stride length increased, the patient has been walking the same distance with less number of steps. The step length was 34.5 cm before the battery opening, after the battery opening increased to 45.5 cm.

Table I. Changes in Gait Parameters Before and After Surgery

Variables	Opened		Battery		Battery	
	Before Operation	Battery (after 12 hours)	Before Operation	Opened (after 12 hours)	Before Operation	Opened (after 12 hours)

First Step	First Step	Fourth Step	Fourth Step	Last Step	Last Step
Step lenght	34.5	45.5	33.5	46	46
Double step lenght	66.5	87	87	66.5	75
Step width	10	11	11	6	11
					4

The step width didn't change unlike the first assessment. The number of steps per minute and cadence were reduced. 6-m walking speed test was 5.57 seconds at the before opening the battery, 6.98 seconds was recorded at after the opening.

Table II. Changes in Speed, Cadence and 6 M Walk Test Results Before and After Surgery

Variables	Before Operation	Battery Opened (after 12 hours)
Speed (m/s)	0.99	1.27
Cadence (steps/second)	1.12	0.91
6 m walk test(s)	5.95	7.63

**Conclusions:** Surgical treatment of Parkinson's disease, which STN-DBS is an effective treatment to improve gait ability.

#### 1204

##### The effect of bilateral subthalamic nucleus deep brain stimulation on excessive sweating in Parkinson's disease

B. Kocer, H. Guven, S.S. Comoglu, L. Das, E. Barbin (Ankara, Turkey)

**Objective:** To evaluate subjective improvement on sweating disturbances reported by the patients with Parkinson's disease (PD) and its relation between motor improvement and dopaminergic treatment doses on the sixth month after subthalamic nucleus (STN) deep brain stimulation (DBS).

**Background:** Autonomic dysfunction and particularly sweating disturbances are common in patients with PD. Improvement on sweating disturbances may occur as a result of the motor improvement after STN DBS indirectly and/or of a direct effect of DBS on STN and adjacent structures which affecting the autonomic functions.

**Methods:** In this prospective study 59 patients diagnosed with idiopathic PD (32 male, 54.2%) according the UK Brain Bank criteria were evaluated with a semi-structured sweating questionnaire before STN DBS and also on the sixth month of the stimulation. Subjective improvement of excessive sweating reported by the patients after STN DBS were noted. The severity of clinical symptoms were measured using Unified Parkinson's disease Rating Scale (UPDRS) II and III; and dopaminergic treatment dosage calculated as levodopa equivalent dose (LED).

**Results:** The mean age was  $53.93 \pm 10.06$  and the mean disease duration was  $14.09 \pm 6.88$  years. Fifty-one patients (86.4%) and 19 patients (32.2%) reported excessive sweating before STN DBS and on the sixth month of the stimulation respectively. Mean 64.41% improvement on excessive sweating reported by the patients after STN DBS. Preoperative UPDRS part II and III scores were  $23.51 \pm 7.39$  and  $31.42 \pm 9.82$ ; post-operative UPDRS part II and III scores were  $10.54 \pm 5.71$  and  $13.34 \pm 7$ . Preoperative LED was  $1321.02 \pm 512.25$  mg, while postoperative LED was  $660.25 \pm 327.78$  mg. Mean 55.15%; 57.55%; and 50.02% reduction found on UPDRS part II; III scores and LED respectively.

**Conclusions:** Our findings indicated that notable improvement reported by the PD patients on excessive sweating after STN DBS. We thought that this effect of STN DBS on sweating disturbances related with motor improvement affecting by STN DBS and the reduction of LED all together.

#### 1205

##### Perceived clinical and adjustment needs related to deep brain stimulation for movement disorders: A metasynthesis



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# INVESTIGATION OF DEEP BRAIN STIMULATION SURGERY EARLY TERM RESULTS OF GAIT CHARACTERISTICS ON PARKINSON'S DISEASE: CASE REPORT

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## Introduction

The person with Parkinson's Disease (PD) develops over time a typical gait[1]. While gait abnormalities are not pronounced in the early stages, their prevalence and severity increase with disease progression. Within 3 years of diagnosis, more than 85% of people with clinically probable PD develop gait problems[2].The potential consequences of gait impairments in PD are significant and include increased disability, increased risk for falls, and reduced quality of life[2,3].The gait disorders are characterized by the spatiotemporal regulation difficulty (shortened stride length), stride velocity, stride width, longer double support, cadence and movement strategies[4,5].

Deep Brain Stimulation (DBS) is a preferred surgical treatment for advanced Parkinson's disease. DBS can reduce the symptoms including tremor, speech disorders, bradykinesia or akinesia. The DBS was proposed as a new stereotactic target for neurosurgical treatment of PD. The main reason supporting this therapeutic approach is the significant improvement of axial symptoms in PD, in particular freezing of gait, frequency of gait and postural instability[6]. The aim of this study was to investigate the early effects of the Pedunculopontine Nucleus Deep Brain Stimulation (PPN-DBS) surgery on characteristics of gait.

## Results

After opening the battery step length and stride length increased, the patient has been walking the same distance with less number of steps. When the battery closed, the step length was 34.5 cm, following the battery opening it increased to 45.5 cm. The step width didn't change unlike the first assessment (Table I). The number of steps per minute, cadence, reduced. While 6-m walking speed test was 5.95 seconds before opening the battery, 7.63 seconds was recorded after opening (Table II).

Table I Changes in Gait Parameters when the Battery Is Off and On

	Battery off Opened (after 12 hours)	Battery off Opened (after 12 hours)	Walking velocity (m/s)	
Step length (cm)	34.5	45.5	0.99 m.s <sup>-1</sup>	1.27 m.s <sup>-1</sup>
Stride length (cm)	66.5	87	1.12 s.s <sup>-1</sup> (76.26)	0.91 s.s <sup>-1</sup> (66.02)
Step width (cm)	10	11	4	11.5

Table II Changes in Speed, Cadence and 6-m Walk Speed Test Results when the Battery Is Off and On

	Battery off Opened (after 12 hours)	Battery off Opened (after 12 hours)	
Walking speed (m/s)	0.99 m.s <sup>-1</sup>	1.12 m.s <sup>-1</sup>	0.91 s.s <sup>-1</sup> (66.02)
Cadence (steps/second)	11.5	11.2	11.5

## Participant

The patient was a 67-year-old, right-handed Turkish man with an 8 years history of Parkinson's disease. His complaints were difficulty in walking, bradykinesia (slowness of movement), and tremor. His antiparkinsonian medication was started eight years ago. The medical regimen at this time consisted of Amantadine 200 mg per day, and Biperiden HCl 2 mg per day. The patient didn't benefit from treatment despite the regular use of medication. Gait disturbance got worse after medication. His neurological examination revealed postural instability, bradykinesia, axial rigidity, right hand pronounced bilateral minimal rigidity, and no pathological reflexes. Pedunculopontine Nucleus Deep Brain Stimulation (PPN-DBS) surgery was applied to the patient.

## Methods

The gait parameters were evaluated by using foot print method. Step length, stride length and stride width in fist, fourth and seventh steps were recorded. Also walking velocity and cadence were recorded.

6 Meter Walking Test was used to evaluate walking speed rate. All assessments were made after surgery when the battery is turned off, and the battery is turned on after 12 hours of surgery.

## Conclusion

Gait disorders and postural instability are common in patients with Parkinson's disease. We discussed the gait characteristics of a patient with PPN-DBS surgery. All assessments were made after surgery the battery is turned off, and the battery is turned on after 12 hours of surgery. After opening the battery step length and stride length increased, the patient has been walking the same distance with less number of steps. The stride width didn't change unlike the first assessment. The number of steps per minute, cadence, were reduced. 6-m walking speed test score was increased. These results indicate that there is an improvement in the festinating gait of the patient.

Therathasan et al. found that the Gait and Falls Questionnaire score, improved significantly with stimulation and benefits were maintained over 2 years with five consecutive patients who have Parkinson's disease complicated by severe gait freezing, postural instability and frequent falls [7]. Bakker et al. performed a systematic review of early studies examining the effect of DBS on postural instability and gait disturbances (PIGD) symptoms and 6 months after surgery PIGD symptoms significantly improved was found [8]. Consequently, our results are consistent with the literature.

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