received DBS for severe TS at St Andrews War Memorial Hospital, Brisbane, Australia from September 2008 to February 2012. The average patient age was 28. Clinical indices for (i) tic severity (Yale Global Tic Severity Score) and (ii) depression (Hamilton Depression rating Scale) and (iii) age were collected pre and post DBS. These clinical data were converted QALYs using standardized coefficients derived from a multivariate regression published by Müller-Vahl *et al* (2010) for a sample 200 German outpatients ($R^2 = 54\%$).

The direct costs for DBS, included hardware, surgical implantation, inpatient stay, neurostimulator programming and adverse events. For BMT direct costs included estimates for rehabilitation, inpatient stay, outpatient treatment, pharmaceuticals and ancillary treatments. All costs were reported in $US2016. TreeAge® software was used to estimate an Incremental Cost Effectiveness Ratio (ICER) using a Markov model, with a 10-year time horizon and 3.5% discount rate.

Results: The direct costs of DBS and BMT were estimated to be $USD 124,400 and $USD 34,180, respectively. DBS was estimated to increase health utility from 0.45 to 0.78. The ICER of DBS was estimated to be $USD 27,600 per QALY gained, which is lower than the nominal US Food and Drug Administration (FDA) approved threshold of $USD 50,000 per QALY.

Conclusions: Our initial exploration suggests DBS is a cost-effective treatment for patients with severe TS. However, our economic evaluation contains several limitations. Firstly, indirect costs were not included. Secondly, health utilities pre and post DBS were imputed from clinical data rather than measured directly. Thirdly, long-term costs and benefits are uncertain; an average age of 28 years at implant implies a further 50 years of life post DBS. The ICER was sensitive to estimates of adverse events. Finally, our results were derived from a small sample. Future research will administer a survey of healthcare costs and QALYs to an international database of TS patients treated with DBS maintained by the University of Florida, with the aim of developing a more robust economic evaluation.

#8546

Preliminary Experience with Chronic Directional DBS in the STN

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Keywords: Subthalamic nucleus, Deep brain stimulation, Directional electrode, Parkinson's disease, Volume of tissue activated.

Introduction: STN DBS has been shown to drastically improve motor symptoms of PD. However, the occurrence of disabling side effects may limit the benefit of the therapy. Computed models have suggested that directional stimulation could increase its efficacy. Intraoperative studies performed in human have shown that directional stimulation provides differents thresholds for clinical effects. In the present study, we investigate the effect of directional stimulation on beneficial and side effects, in chronically implanted patients compared to omnidirectional stimulation.

Methods: 11 bilateral STN implanted PD patients have been prospectively included in this study. In the trajectory determined after microrecording and intraoperative clinical testing, the definitive directional lead (1-3-3-1 electrode configuration, Vercise, Boston Scientific) was implantated with one electrode oriented medially, one anterolaterally and the third posterolaterally, under intraoperative fluoroscopic control. Monopolar omnidirectional stimulation was initially performed. 2–3 month after surgery, directional stimulation was assessed. The current threshold for beneficial and side effects was assessed for each of the 3 directions and compared to omnidirectional stimulation.

Results: A best direction of stimulation was observed in all patients in terms of therapeutic window. The current required to obtain a beneficial effect in the best direction showed a mean reduction of 25% compared to the omni-directional condition. The current required to achieve a sustained side effect in the worst direction was comparable to the in the omni-directional situation. The medially oriented directional electrode war found in 9/14 sides to have the highest threshold for side effects.

Conclusion: Our preliminary experience using Directional DBS in the STN performed postoperatively suggests the persistence of different thresholds for the appearance of clinical effects in directional stimulation conditions, compared to omnidirectional stimulation. Further data are needed to confirm these observations.

#8565

Long-Term Efficacy of Constant Current Deep Brain Stimulation in Essential Tremor

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Keywords: Constant current, Essential tremor, Deep brain stimulation, Constant voltage.

Objectives: The aim of this study was to evaluate the long-term efficacy and safety of the constant current devices (Libra DBS System™) produced by St. Jude's Medical in patients with essential tremor.

Design: The inclusion criteria required all the patients to have had a clinical diagnosis of essential tremor by a movement disorder neurologist, deemed suitable for DBS by a multi-disciplinary team consisting of a movement disorders neurologist, neuropsychologist, neuropsychiatrist, movement disorders neurosurgeon, and a deep brain stimulation (DBS) specialist nurse, and had a minimum of 3 years of constant current stimulation of the Vim DBS. Patients with other movement disorders were excluded.

Subject: Ventralis intermedius (Vim) DBS is an established intervention for medication-refractory essential tremor. Newer constant current DBS technology offers theoretical advantage over the traditional constant voltage systems in terms of delivering a more biologically stable therapy. There are no previous reports on the outcomes of Vim constant current DBS in the treatment of essential tremor. Here we report on the long-term effi-