

Alpha Omega Gold Service

Case Report

Alpha Omega's On-Site DBS Support Services
During DBS Implantation at STN or GPi targets for
Parkinson's disease and Dystonia.



Defining Neuroscience Technology

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Alpha Omega Gold Service

Use Case during Surgery

This case-report describes the use of innovative technologies as part of Alpha Omega's Gold Service during a DBS surgery and the way those technologies affect Intraoperative clinical decisions.

The intraoperative Microelectrode Recording (MER) system used in the surgery is **Neuro Omega**.

Introduction

Microelectrode recording (MER) is a common practice during DBS procedures in which neural recording and stimulation are used for DBS target localization. During MER phase, one or more micro-electrodes are used, to record the neural activity in order to determine the DBS lead implantation location.

Interpretation of the recorded signal and optimal implantation location recommendation demands significant experience and the presence of a Neurophysiologist in the OR.

Case description

Patient Details	
Condition	Parkinson's Disease
Gender	Male
Age	59
Dominant side	Right
Dominant symptoms	Tremor, Rigidity
DBS Target	Bottom of left STN
MER Setup	Neuro Omega with Electrical drive

Tools and Technologies Used

Neuro Omega System
Neuro Omega Drive Headstage
NeuroProbe 1 electrode in the central track
HaGuide*
LeadConfirm**
Abbott 6180 segmented lead

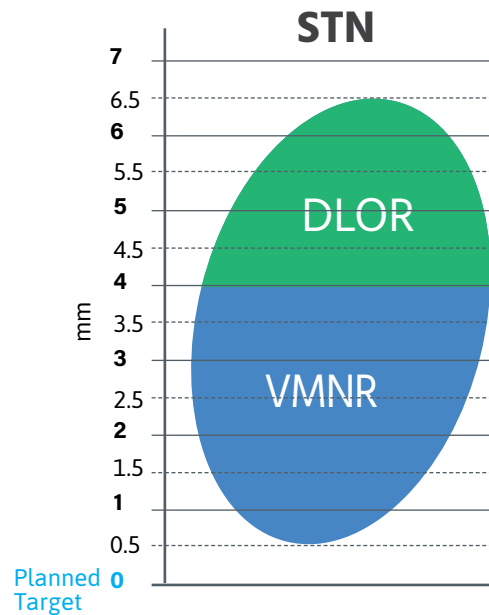
***HaGuide** is a real time software solution designed to accurately detect the STN and GPi regions and its entrance and exit boundaries using microelectrode recording during surgery. The HaGuide also detects STN subregions boundaries; Dorso Lateral Oscillatory Region (DLOR) and Ventro Medical non-oscillatory region (VMNR).

**** Sterile LeadConfirm** is a tool that enables seamless connectivity between the most common DBS (Deep Brain Stimulation) leads on the market and Alpha Omega’s microelectrode recording systems.

Surgery Flow

1. Starting depth was set to 25 mm above target.
2. Neurosurgeon activated the HaGuide

HaGuide Determination	Distance from planned target (mm)
STN entry	6.5
STN exit	0.5
DLOR	6.5 - 4
VMNR	4 - 0.5



3. Once the HaGuide has identified the STN in all trajectories, it recommends the optimal location for stimulation to the neurosurgeon.

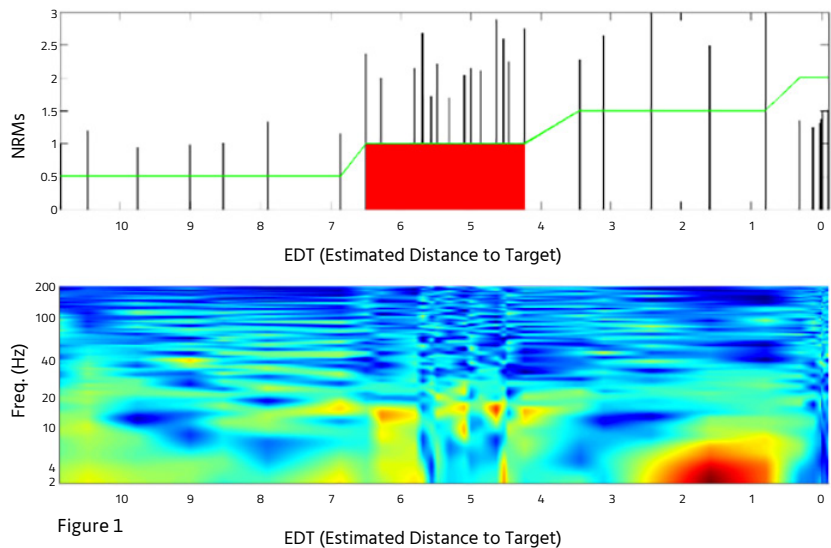


Figure 1

4. After confirming the implantation location, Neurosurgeon Implanted Abbott 6180 segmented lead, locating bottom of Contact 1 (see figure 4) at 0.5mm above target the bottom of STN border as detected by HaGuide, "A" contact faces posterior.

5. After placing the lead in the desired depth, Neurosurgeon connected the lead to the headstage using Alpha Omega's Sterile **LeadConfirm-A** Cable. The LeadConfirm recording showed strongest beta frequencies on Contacts 3A, 3B and 3C on the referential graphs, as well as beta activity on all differential recordings between the segments 3A-2A, 3B-2B and 3C-2C which are an indication that the lead is fully inside the STN.



LeadConfirm-A cable
compatible with Abbott's DBS leads

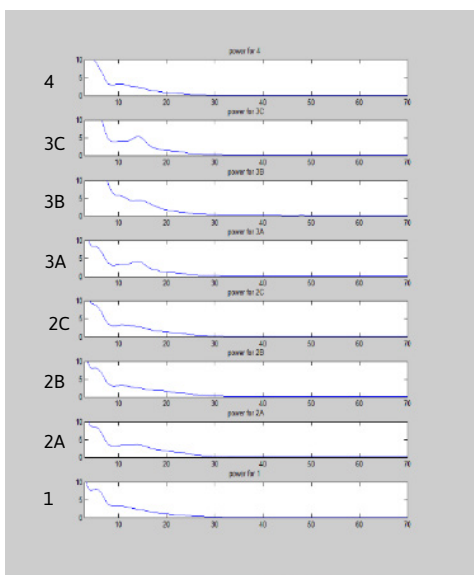


LeadConfirm-B cable
compatible with Boston Scientific's DBS leads



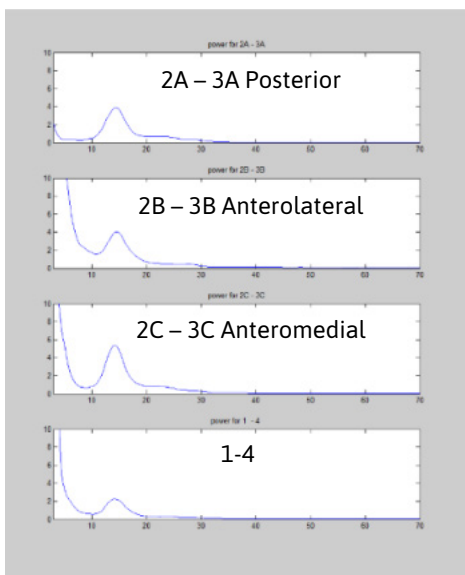
LeadConfirm-M cable
compatible with Medtronic's DBS leads

Figure 2



LeadConfirm Referential (monopolar)

Figure 3



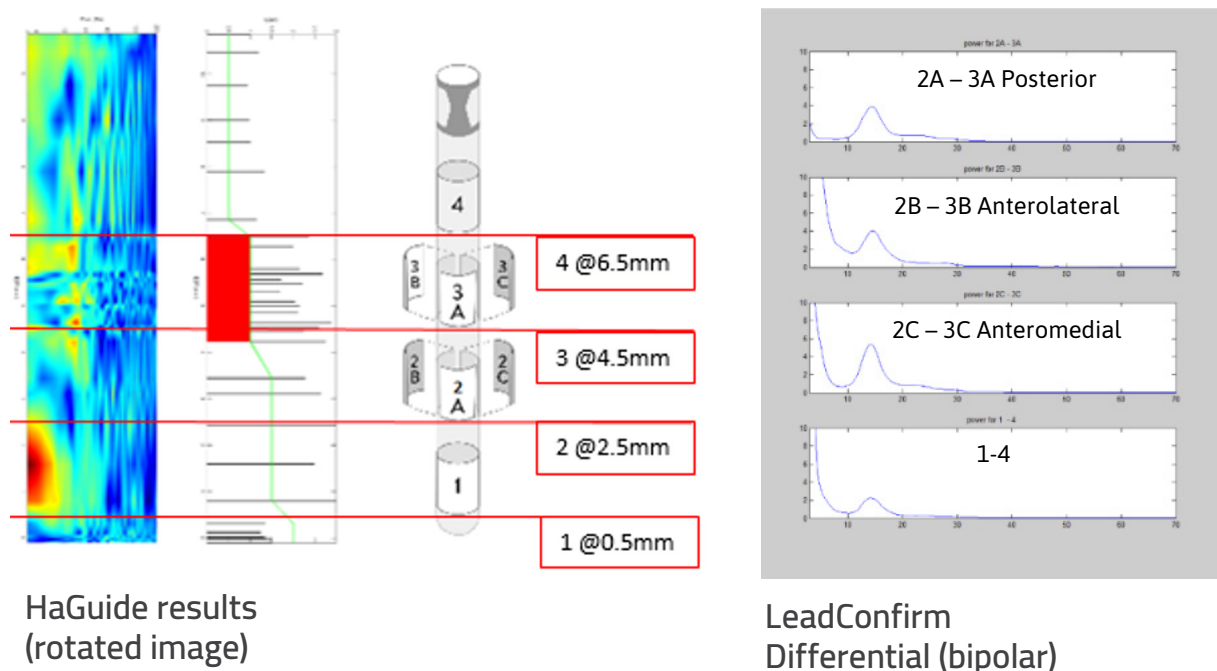
LeadConfirm Differential (bipolar)

Clinical outcomes

The MER interpretation results by the doctor showed STN entry at ~6.5mm above target, and STN exit at ~0.5mm above target, combined with somatosensory testing which confirmed motor response twice between 6.5mm and 4mm above target.

The HaGuide and LeadConfirm results side by side

Figure 4



In these results we can see the third lead contact is completely inside the motor region according to the HaGuide results. The LeadConfirm results provide spatial information about the location of the lead contacts, the results are showing that segments A, B and C of contact 3 are all recording beta frequency which is an indication of STN motor region.

Intra-operative imaging confirmed that the 3rd contact segments are in the dorsal part of the STN.

Stimulation testing confirmed a good therapeutic window on the 3rd contact segments, the other contacts and segments were less effective.