Tuning Maps for Deep Brain Stimulation Trials

Thomas Mera, MS
Product Development Manager
May 23rd, 2013

WILL BEGIN
AT 12:00 EST
Talking Points

1. Market Opportunities
2. DBS Tuning Maps
3. Kinesia ProView
4. Clinical Trial Data and Lessons
5. Kinesia Technology Value Added
Market Opportunities
Parkinson’s Disease: Not So Simple!

**SYMPTOMS**
- Tremor
- Dyskinesias
- Bradykinesia
- Rigidity
- Gait
- Non-Motor et al.

**TREATMENTS**
- Levodopa
- Rasagiline
- Duodopa
- DBS
- Exercise
- Neuroprotection?

**DEMOGRAPHICS**
- Over 60
- Growing Incidence
- Neurodegeneration
- Medicare
- VA
- Access to Care
Deep Brain Stimulation

Targeted Electrical Stimulation of the Brain

Therapy State Management

“ON State” with Therapy-Induced Dyskinesia

“On” State

“Off State” (Symptomatic)

Time of the Day
Challenges with DBS Programming

- Clinician Training
- Paper Trails
- Symptom Tracking
- Sensitivity
DBS Tuning Maps
Quantitative Motor Assessment

TRADITIONAL

HIGH SENSITIVITY
Kinematic Response to DBS

Tremor tuning produces sudden, dramatic effects

Bradykinesia tuning produces gradual, fine effects
Monopolar Symptom Response

Patient 3

Rest Tremor

Postural Tremor

Kinesia Score vs. Stimulation Voltage

GREAT LAKES NEUROTECHNOLOGIES
Monopolar Symptom Response

Patient 3

Finger-Tap Speed

Finger-Tap Amplitude

Kinesia Score

Stimulation Voltage

Kinesia Score

Stimulation Voltage
Monopolar Symptom Response

Patient 8

Rest Tremor

Postural Tremor

Kinesia Score vs. Stimulation Voltage

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Monopolar Symptom Response

**Patient 8**

**Finger-Tapping Speed**

![Graph showing finger-tapping speed vs. stimulation voltage with Kinesia Score on the y-axis and Stimulation Voltage on the x-axis.]

**Finger-Tapping Amplitude**

![Graph showing finger-tapping amplitude vs. stimulation voltage with Kinesia Score on the y-axis and Stimulation Voltage on the x-axis.]

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**Great Lakes Neurotechnologies**
Tuning Maps: Visualizing the Programming Space

Kinematic optimization of deep brain stimulation across multiple motor symptoms in Parkinson’s disease
Mera TO, Vitek JL, Alberts JL, Giuffrida JP
Kinesia ProView Product Demo
Commercialization

FDA Clearance to Market

• 510k Clearance to Market
• Intended Use
  • Kinesia is intended to monitor physical motion and muscle activity to quantify kinematics of movement disorder symptoms such as tremor and assess activity in any instance where quantifiable analysis of motion and muscle activity is desired.

ISO, CE Mark, and TGA

• ISO 13485:2003
• European Medical Device Directive 93/42/EEC
• Canadian Medical Device Conformity Assessment System
• EMERGO EUROPE: Authorized Agent

Standards and Testing

• Tested to IEC 60601 Standards
• Complies with FCC Part 15 Rules
• HIPAA Compliant

U.S. Patent Protection
Institute-Specific Patient List

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Scroll to select patient

There are 0 sessions to upload

Refresh  Select  Logout
Programming Session Setup
Tuning Map Screen
Stimulation Setting Selection

- Amplitude: 0 mA
- Configuration: A
- Frequency: 130 Hz
- Pulse Width: 60 µsec
- Polarity: 
  - 00: OFF
  - 01: OFF
  - 02: OFF
  - 03: OFF
  - 04: OFF
  - 05: OFF
  - 06: OFF
  - 07: OFF
  - 08: OFF

Notes on this configuration would go here.

- Accept
- Edit
- Select
- Save
Sensor-Based Assessment
Sensor-Based Assessment
Manual Task Assessment
Populated Tuning Map
Context-Specific Information
Select Side Effect
Online Management
Online DBS Programming Reports
Clinical Trial Data and Lessons
Tuning Maps: Rest Tremor

Subject A

Subject B

Subject C

Contact

Amplitude (v)
Subject 1: Rest Tremor

Clinician UPDRS

Kinesia ProView
Subject 1: Finger Tap Detail
Subject 2: Rest Tremor

Month 1

Month 4
Subject 2: Finger Tap Bradykinesia

Month 1

Month 4

Contact

Amplitude (V)

GREAT LAKES NEUROTECHNOLOGIES
Subject 3: Rest Tremor

Month 1

Month 2

Month 4

Contact

Amplitude (V)
Subject 3: Finger Tap Bradykinesia

Month 1

Month 2

Month 4

Contact

Amplitude (V)
Kinesia Technology Value Added
ProView Value Added to DBS

Visual Assessment of Programming Space
• Minimize Symptoms, Maximize Battery Life

High Sensitivity Symptom Differentiation
• Detect Small Changes and Specific Symptom Response to Unique Stimulation Configurations

Cloud-Based Data Storage
• Track changes over time and minimize paper trails
Applications and Markets
Patient Care
Clinical Trials
DBS Programming
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<th>Postural Tremor</th>
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**Increase dose by 200mg, Dose interval unchanged**

**Decrease dose by 100mg, Decrease dose interval by 2 hours**

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**Great Lakes Neurotechnologies**
ProView and HomeView Value Added to DBS

Patient Screening
• Ready for DBS? Matching patient characteristics to therapies

Post Programming Symptom Response
• Do symptoms remain stable at home?

Intelligent and Remote Programming
• Clinician controlled and algorithm-based programming via telemedicine and broadband communications
Questions?

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216-446-2438

http://glneurotech.com/kinesia/proview/