Single Site Clinical Experience – DBS Programming Guidelines

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Electrode selection

- **Unipolar**—using one of the four electrodes on the quadripolar lead as the negative pole (cathode) and the neurostimulator case as the positive (anode) pole.
  - Using a unipolar setting provides a larger area of stimulation which may provide better control of symptoms (especially tremor). However, these settings may lead to increased side effects (dysarthria, paresthesia).
- **Bipolar**—using one of the quadripolar leads as the positive pole and one of the remaining electrodes acts as the negative pole. The neurostimulator case is not active.
  - Bipolar stimulation creates a narrower, more focused field of current and is strongest at the negative pole.
  - When using a bipolar setting with proper lead placement, the programming results should be positive and be able to limit side effects.

Amplitude

- Average amplitude for STN placement is 3.0 volts. For VIM placement it may be higher.
- Where the amplitude is set will depend on the patient’s symptoms, especially if they have tremor (tremor usually requires higher amplitudes).
- The higher the amplitude, again, the more chance for side effects, but most patients do tolerate to 4 to 5.0 volts.
- The battery consumption doubles when the amplitude is set above 3.6 volts (for a Soletra battery).

Pulse Width

- Pulse width for STN placement is usually 60. For patients with tremor 90 may be used. For VIM placement, pulse width is usually set at 90. For patients with severe tremor it may be set at 120.
- Again, the higher the pulse width the greater the efficacy, but also greater chance of side effects.

Frequency (rate)

- Rate both for STN/VIM is usually set at 185.
- In instances where side effects are present and efficacy is not affected, a suggestion may be to decrease the rate to 145.

Soft Start

Soft start is most useful when the patient is turning their device off at night and back on in the morning (i.e. VIM placement for tremor). It will increase the amplitude a tenth of a volt per second versus going from 0 volts to the patient’s current voltage in one second.

If a patient complains of paresthesias that are uncomfortable when turning their device on, using soft start may make them more comfortable with turning their device on and off.
Other

• Initially, it is ideal to set up a patient’s programming sessions for the day following IPG placement, and then every one to two weeks for the next one to two months. Once programming and medication adjustments are stable, patient may be seen every three to six months.
• The recommendation would be not to start reducing a patient’s antiparkinsonian medications until their devices are turned on and they are finding benefit in their off signs and symptoms.
• Initial programming session may last one hour, but subsequent sessions are usually 30 minutes.
• Educate patients that the changes seen with programming may take five to seven days to take full effect. Therefore, unless side effects are present, changing the programming more often than every week may lead to lack of efficacy with the device.
• Parkinson’s patients should keep their device on at all times for best clinical efficacy. Patients who solely have tremor (i.e. essential tremor) can turn their devices off at night.