TITLE: A retrospective evaluation of automated optimization of deep brain stimulation parameters.

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ABSTRACT:

Objective:

We perform a retrospective analysis of a proposed optimization algorithm for the computation of patient-specific multipolar stimulation configurations. We evaluate whether its application has the potential to lead to an equal or better stimulation of the target region as manual programming, while reducing the time required for programming sessions.

Methods:

For three patients (five electrodes) diagnosed with essential tremor, we derived optimized multipolar stimulation configurations using an automated algorithm. These results were then compared to clinically derived settings.

Results:

We observe a good agreement between the findings of manual programming and the optimized stimulation configurations, with the algorithm selecting a contact that was found to be therapeutically beneficial in the monopolar review in 80% of the cases. Additionally, our simulation results predicted the optimized stimulation settings would lead to the activation of an equal or larger volume fraction of the target compared to the manually determined settings in all cases.

Conclusions:

Optimal DBS settings as determined by an automated algorithm closely resemble clinically derived settings.