Balancing Cohort Size and Variability in Iterative Deep Brain Template Creation.

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Abstract

This study investigates the effect of cohort size on the creation of cohort-specific deep brain anatomical templates for movement disorder. Pre-operative MRI data from 70 patients implanted with deep brain stimulation (DBS) systems were used to generate anatomical templates with varying cohort sizes (5 to 67 subjects). An iterative non-linear normalization pipeline was employed to optimize template generation. Template variability was assessed using Dice overlap of anatomical structures. The templates created with 44 subjects achieved optimal balance between variability and accuracy. Tukey's HSD test confirmed significant differences across iterations and cohort sizes. This study underscores the importance of cohort size and iterative registration methods in creating high-quality anatomical templates.

Clinical relevance

The findings provide insights into the optimal cohort size for creating anatomical brain templates.