Robot-Assisted Stereotaxy Reduces Target Error: A Meta-Analysis and Meta-Regression of 6056 Trajectories

Lucas R Philipp, MD, MPH, Caio M Matias, MD, PhD, Sara Thalheimer, BA, Shyle H Mehta, MA, Ashwini Sharan, MD, Chengyuan Wu, MD, MSBmE
Robot-Assisted Stereotaxy Reduces Target Error: A Meta-Analysis and Meta-Regression of 6056 Trajectories

**Systematic Review**
- 2,961 Potential Studies
- 27 DBS
- 10 sEEG
- N=37 Eligible Studies

**Meta-analysis and Multivariate Regression:** To determine Mean Target Error (MTE) of implanted electrodes for DBS or sEEG

**Results**
- Robot Use: 0.79mm MTE reduction ($P = .0019$)
- Frameless: 0.50mm MTE increase ($P = .0032$)

**Conclusions**
- Use of Robot-assistance for stereotactic electrode implantation is independently associated with improved accuracy & reduced target error.

This remains true among all settings explored, regardless of other procedural factors, including Frame-based vs Frameless technique.

Phillip et al. *Neurosurgery.* October 2020