

Long-Term Clinical Changes of Nacc/Alic DBS in OCD Patients: Evolution of Improvement after more than three years of Continuous Stimulation

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Abstract

Introduction: Deep brain stimulation (DBS) is an effective therapeutic option for treatment-resistant obsessive-compulsive disorder (OCD). Previous studies have primarily documented efficacy in the short and medium-term, typically up to one year after DBS. However, its long-term effects remain unclear. Our aim is to identify and quantify improvement following long-term follow-up of more than three years, and assess changes—whether improvement or worsening—after the first postoperative year in OCD patients treated with DBS. **Method:** Thirty patients diagnosed with resistant-treatment OCD who underwent Nucleus Accumbens (NAcc) and Anterior Limb of the Internal Capsule (ALIC) DBS surgery at University Hospital Cologne were included in this study. The Yale-Brown Obsessive Compulsive Scale (Y-BOCS) was applied to assess clinical baseline and follow-up after surgery. A retrospective, observational study between 2004 and 2022 was conducted. Clinical outcomes were assessed at three time points: T0 (baseline), T1 (one year post-surgery), and T2 (three or more years post-surgery). Y-BOCS scores were used to classify severity into three categories: extreme (32–40 points), severe (24–31 points), and moderate (16–23 points). Patients with Y-BOCS score reductions above 35% were considered full responders. Scores and percentage reduction of symptoms were compared and analyzed using repeated measures ANOVA. All data were disclosed with informed consent of the patients.

Results: Patients with extreme (n=15) and severe (n=12) symptoms demonstrated statistically significant improvements ($p < 0.001$) across all three follow-up time points. Full responders (n=22) showed significant differences between baseline (T0) and latest follow-up (T2), as well as between

one year post-surgery (T1) and latest follow-up (T2) ($p < 0.001$). Among the three severity categories, 80%, 66.6%, and 77.7% of patients with extreme, severe, and moderate symptoms were full responders, respectively. A significant response across the three time points was not found among non-responders ($p > 0.05$). Among full responders at long-term follow-up (T2), 8 of 22 patients did not meet full-responder criteria after the first year of stimulation (T1).

Discussion: Based on our findings, DBS for OCD showed meaningful, sustained benefits for patients with the most severe symptoms, as they consistently improved over time. Full responders experienced clear long-term gains, even if some did not show full improvement in earlier stages. The majority of patients across all symptom severity levels ultimately responded well to the intervention. In contrast, those who did not respond showed little to no measurable change throughout the follow-up period, highlighting a distinct difference in treatment outcomes between responders and non-responders.

Conclusions: Results one year after surgery are not always definitive. Significant symptom reduction in the first year usually leads to greater reduction long-term. If this threshold is not reached, results are not necessarily final, but the chance of worsening after early improvement remains low.

References

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