

Fornico-dorso-commissural tract

In a short-term [trial](#), which was conducted during invasive [monitoring](#) in the [epilepsy](#) monitoring unit, LFS (5 Hz) of the human dorsal [hippocampal commissure](#) reduced [temporal lobe seizures](#) by 90%. As this [fiber tract](#) is very close to the posterior arching fornices, the target was termed the [fornico-dorso-commissural tract](#).

Pharmacoresistant bilateral [mesial temporal lobe epilepsy](#) often implies poor resective surgical candidacy. Low-frequency stimulation of a fiber tract connected to bilateral hippocampi, the fornicodorsocommissural tract, has been shown to be safe and efficacious in reducing seizures in a previous short-term study. Here, we report a single-blinded, within-subject control, long-term deep-brain stimulation trial of low-frequency stimulation of the fornicodorsocommissural tract in bilateral mesial temporal lobe epilepsy. Outcomes of interest included safety with respect to verbal memory scores and reduction of seizure frequency.

Methods: Our enrollment goal was 16 adult subjects to be randomized to 2-Hz or 5-Hz low-frequency stimulation of the fornicodorsocommissural tract starting at 2 mA. The study design consisted of four two-month blocks of stimulation with a 50%-duty cycle, alternating with two-month blocks of no stimulation.

Results: We terminated the study after enrollment of five subjects due to slow accrual. Fornicodorsocommissural tract stimulation elicited bilateral hippocampal evoked responses in all subjects. Three subjects underwent implantation of pulse generators and long-term low-frequency stimulation with mean monthly seizures of 3.14 ± 2.67 (median 3.0 [IQR 1-4.0]) during stimulation-off blocks, compared with 0.96 ± 1.23 (median 1.0 [IQR 0-1.0]) during stimulation-on blocks ($p = 0.0005$) during the blinded phase. Generalized Estimating Equations showed that low-frequency stimulation reduced monthly seizure-frequency by 0.71 per mA ($p < 0.001$). Verbal memory scores were stable with no psychiatric complications or other adverse events.

Significance: The results demonstrate feasibility of stimulating both hippocampi using a single deep-brain stimulation electrode in the fornicodorsocommissural tract, efficacy of low-frequency stimulation in reducing seizures, and safety as regards verbal memory ¹⁾.

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Koubeissi MZ, Joshi S, Eid A, Emami M, Jaafar N, Syed T, Foreman PJ, Sheth A, Amdur R, Bou Nasif M, Puente AN, Aly R, Chen H, Becker A, Gholipour T, Makke Y, Elmashad A, Gagnon L, Durand DM, Gaillard WD, Shields DC. Low-frequency stimulation of a fiber tract in bilateral temporal lobe epilepsy. *Epilepsy Behav.* 2022 Mar 25;130:108667. doi: 10.1016/j.yebeh.2022.108667. Epub ahead of print. PMID: 35344808.

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