

Stereotactic laser ablation

see [Laser interstitial thermal therapy](#).

Stereotactic [laser ablation](#) and [neurostimulator](#) placement represent an evolution in staged surgical [intervention](#) for [epilepsy](#). As this practice evolves, optimal targeting will require standardized [outcome](#) measures that compare [electrode lead](#) or laser source with postprocedural changes in [seizure](#) frequency.

Miller et al., proposed and presented a novel [stereotactic coordinate system](#) based on mesial temporal anatomical [landmarks](#) to facilitate the [planning](#) and delineation of outcomes based on extent of ablation or region of stimulation within mesial temporal structures.

The body of the [hippocampus](#) contains a natural axis, approximated by the interface of [cornu ammonis \(CA4\)](#) and the [dentate gyrus](#). The [uncal recess](#) of the [lateral ventricle](#) acts as a landmark to characterize the anterior-posterior extent of this axis. Several volumetric rotations are quantified for alignment with the mesial temporal coordinate system. First, the brain volume is rotated to align with standard [anterior commissure-posterior commissure \(AC-PC\)](#) space. Then, it is rotated through the axial and sagittal angles that the hippocampal axis makes with the AC-PC line.

Using this coordinate system, customized [MATLAB](#) software was developed to allow for intuitive standardization of targeting and interpretation. The angle between the AC-PC line and the hippocampal axis was found to be approximately 20°-30° when viewed sagittally and approximately 5°-10° when viewed axially. Implanted electrodes can then be identified from CT in this space, and [laser](#) tip position and burn geometry can be calculated based on the intraoperative and postoperative MRI.

With the advent of stereotactic surgery for mesial temporal targets, a mesial temporal stereotactic system is introduced that may facilitate operative planning, improve surgical outcomes, and standardize outcome assessment ¹⁾.

¹⁾

Miller KJ, Halpern CH, Sedrak MF, Duncan JA, Grant GA. A novel mesial temporal stereotactic coordinate system. J Neurosurg. 2018 Jan 1;1-9. doi: 10.3171/2017.7.JNS162267. [Epub ahead of print] PubMed PMID: 29372873.

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