

Stereotactic System

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In traditional frame-based [stereotactic biopsy](#), a rigid [Stereotactic System](#) is attached to the patient's head. This frame serves as a reference point and helps guide the surgeon to the precise coordinates of the target tissue.

[Cooper Stereotactic Device.](#)

[Leksell Stereotactic System.](#)

[Starfix.](#)

Knorr et al. developed a patient-specific stereotactic [system](#) that allows simultaneous and thus time-saving treatment of both cerebral [hemispheres](#) that contains all spatial axes and can be used as a [disposable product](#). Furthermore, the goal was to reduce the size and weight of the [stereotactic system](#) compared to conventional systems to keep the strain on the patient, who is [awake](#) during the operation, to a minimum. In addition, the currently mandatory computed tomography should be avoided in order not to expose the patient to harmful X-ray radiation as well as to eliminate errors in the fusion of CT and MRI data 3D printing best meets the requirements in terms of size and weight: on the one hand, the use of plastic has considerable potential for weight reduction. On the other hand, the free choice of the individual components offers the possibility to optimize the size and shape of the stereotactic system and to adapt it to individual circumstances while maintaining the same precision. The all-in-one stereotactic system was produced by means of the Multi Jet Fusion process. As a result, the components are highly precise, stable in use, lightweight, and sterilizable. The number of individual components and interfaces, which in their interaction are potential sources of error, was significantly reduced. In addition, on-site manufacturing leads to faster availability of the system. Within the project, a patient-specific stereotaxy system was developed, printed, and assembled, which enables the execution of deep brain stimulation via only three bone anchors

located on the skull. Pre-developed MRI markers, which can be screwed directly onto the bone anchors via the sleeves, eliminate the need for a CT scan completely. The fusion of the data, which is no longer required, suggests an improvement in target accuracy ¹⁾.

¹⁾

Knorr P, Winkler D, Kropla F, Möbius R, Müller M, Scholz S, Grunert R. Development of a 3D-printed, patient-specific stereotactic system for bihemispheric deep brain stimulation. 3D Print Med. 2023 Oct 13;9(1):29. doi: 10.1186/s41205-023-00193-9. PMID: 37831407.

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