Stereotactic System

- Phase 2 Trial of Stereotactic Body Radiation Therapy with Dose Escalation Using Simultaneous Integrated Boost for Spinal Metastases
- Implementation of a novel pencil beam scanning Bragg peak FLASH technique to a commercial treatment planning system
- Stereotactic laser ablation for pediatric central nervous system tumors: a systematic review and meta-analysis of the literature
- A propensity score-matched analysis of stereotactic radiotherapy for metastatic brain tumors using the Leksell Gamma Knife Icon Mask system: a single-center retrospective comparative study of cases meeting and not meeting the JLGK0901 Criteria
- A Novel Therapeutic Strategy for Central Nervous System Lymphoma: Integrating Chimeric Antigen Receptor T-Cell Therapy and Gamma Knife Radiation
- Salvage metastasis-directed therapy versus elective nodal radiotherapy for oligorecurrent nodal prostate cancer metastases (PEACE V-STORM): a phase 2, open-label, randomised controlled trial
- Clinical Assessment of Potential Difference in Motion-Tracking Irradiation for Liver Tumors Using Radixact Synchrony®
- Longitudinal stability of HyperSight^{TM}-CBCT based radiomic features in patients with CT guided adaptive SBRT for prostate cancer

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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].

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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.