Cleveland Clinic Innovations

Stereotactic Non-Invasive Skull Fiducial

Richard Rammo, MD, et al.

PRODUCT

Non-invasive set of reusable stereotactic registration devices for a Leksell frame.

INDICATION

Neurosurgery, skull fiducial, stereotactic procedures, robotic sEEG

VALUE PROPOSITION

- Increased number of registration points facilitates robotic CT stereotaxy.
- Non-invasive, reusable.
- Saves time compared to implantation of individual skull fiducials.

DEVELOPMENT STAGE

- Functional prototypes developed.
- Used in multiple surgeries.

INTELLECTUAL PROPERTY

US provisional patent

CONTACT INFORMATION

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OPPORTUNITY

Intra-operative registration for stereo electroencephalography (sEEG) using the stereotactic robot currently relies on laser or skull fiducial registration. The latter is thought to confer a higher degree of accuracy, and can provide an accurate read-out. This approach seems to be gaining in popularity with increasing centers using intra-operative O-arm images for registration off the skull fiducials. Despite its advantages, the use of skull fiducials is invasive and can be cumbersome, requiring multiple smaller incisions at different sites for direct implantation into the patient's head.

SOLUTION

Novel stereotactic adapters fixed at each quadrant of a Leksell frame allow for accurate O-arm registration, taken quickly and without additional scalp incisions. This stereotactic, non-invasive skull fiducial simplifies the workflow of O-arm registration using the Leksell frame and individual bone fiducials for the purposes of robotic-guided sEEG. This is facilitated by the lack of extra incisions required, as the fixators are applied directly to the Leksell frame. Finally, the accuracy achieved is consistently sub-millimeter, as would be expected from the surgical workflow procedure.