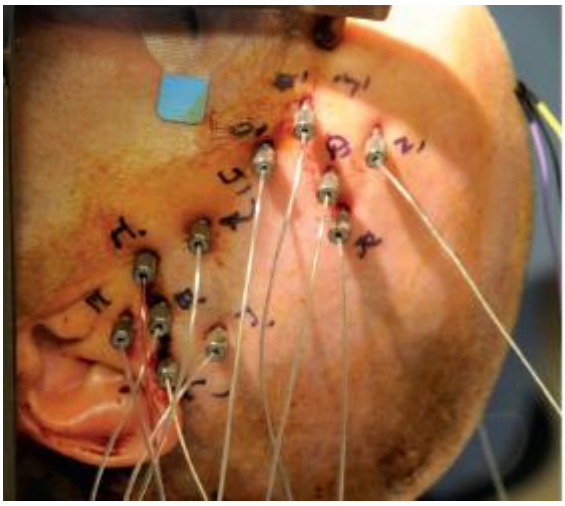
Stereoelectroencephalography electrode implantation accuracy



The accuracy of stereoelectroencephalography electrode implantation is an important factor in maximizing its safety.

The implantation of deep brain electrodes for SEEG by using intraoperative CT O Arm® and the Vertek® articulated passive arm is a safe and effective technique with adequate accuracy [1].

Robot-assisted stereoelectroencephalography electrode placement is highly accurate and is significantly more accurate than optical frameless neuronavigation (ON). Larger safety margins away from vascular structures should be used when placing deep electrodes in young children and for trajectories that pass through thicker soft tissues such as the temporal region [2].

Patient-customized platforms are comparable in terms of safety, accuracy, and simplicity of use to the existing robotic devices for implantation of depth electrodes [3].

Rodionov et al., established a quality assurance (QA) process to aid advances in implantation accuracy.

The accuracy of three consecutive modifications of a frameless implantation technique was quantified in three cohorts comprising 22, 8, and 23 consecutive patients. The modifications of the technique aimed to increase accuracy of the bolt placement.

The lateral shift of the axis of the implanted bolt at the level of the planned entry point was reduced from a mean of 3.0 ± 1.6 mm to 1.4 ± 0.8 mm. The lateral shift of the axis of the implanted bolt at the level of the planned target point was reduced from a mean of 3.8 ± 2.5 mm to 1.6 ± 0.9 mm.

This QA framework helped to isolate and quantify the factors introducing inaccuracy in SEEG implantation, and to monitor ongoing accuracy and the effect of technique modifications [4].

Granados et al., presented a method robust to electrode bending that can accurately segment contact positions and bolt orientation. The techniques presented will allow further characterisation of bending within different brain regions [5].

References

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