

Face Mask Navigation: hochgenau und einfach

Face Mask Navigation: a highly accurate and simple to use system

Ulrich Hubbe¹; Arapakis, Lakovos²; Vougioukas, Vassilios¹

¹Abt. Allg. Neurochirurgie, Neurochirurgische Klinik, Neurozentrum, Albert-Ludwigs-Universität Freiburg

²Hals- Nasen- Ohren- Klinik, Albert-Ludwigs-Universität Freiburg

Objective

There are several possibilities for referencing of a neuronavigation system. Until now pointer based referencing using preoperative implanted bone screws is golden standard for this procedure. Nevertheless skin fiducials worldwide are used for the majority of navigated interventions. There have been several attempts to overcome the intrinsic drawbacks of the use of skin fiducials. We present a new, marker free referencing system for neuronavigation without the need for rigid head fixation.

Methods

We used the Stryker Navigation System and the Face-Mask-Referencing and Tracking device in a cadaver study. The accuracy of face mask referencing and tracking was compared to bone screw based referencing with mayfield fixation. 50 measurements of accuracy during 5 referencing procedures of each of these systems were performed using 8 control markers (bone screw markers) implanted on the cadaver head.

Results

There is no need for additional imaging for neuronavigation as the system needs no markers either on the patient or on the data set. The face mask referencing and tracking device consists of a self adhesive single use foil with 31 LED fixed on it. After the mask is fixed to the patients face, the Stryker navigation system is able to do an automatic referencing to the calculated surface of the patient's 3-D-Dataset. Mayfield fixation is not

necessary as the face mask can be used as a tracking device. The accuracy that was achievable with the face mask was 1.1 mm compared to 1.2 mm of bone screw referencing. Conclusions: The Face-Mask-Referencing and Tracking device is easy to use and facilitates the preoperative preparation time by automatic referencing without fiducials on patient and image data set and without the need for rigid head fixation.

Using our new device we could achieve an accuracy comparable to that of bone screw markers. We already use the system for ENT-Interventions and transsphenoidal pituitary gland surgery.