StealthStation

- Redefining the Cervical Pedicle Entry Point (CPEP) in the Insertion of Cervical Pedicle Screw Using O-Arm Navigation: A Prospective Radiological Study From India
- Targeting accuracy of neuronavigation: a comparative evaluation of an innovative wearable AR platform vs. traditional EM navigation
- Unilateral Stereotactic Radiofrequency Lesioning as a Surgical Treatment Option for Meige Syndrome
- Endoscopic approaches to the posterior wall of the third ventricle: An anatomical comparison
- Bony Surface-Matching Registration of Neuronavigation with Sectioned 3-Dimensional Skull in Prone Position
- Image-guided orbital surgery: a preclinical validation study using a high-resolution physical model
- Combined Transoral Exoscope and OARM-Assisted Approach for Craniovertebral Junction Surgery. New Trends in an Old-Fashioned Approach
- Fluoroscopy-Assisted Freehand Versus 3D-Navigated Imaging-Assisted Pedicle Screw Insertion: A Multicenter Study

https://www.medtronic.com/us-en/healthcare-professionals/products/neurological/surgical-navigation-systems/stealthstation.html

see StealthStation S8.

see StealthStation S7 Surgical Navigation System.

StealthStation i7™ – This versatile, integrated surgical navigation system incorporates all the latest navigation technologies into a ceiling mounted boom system to free up space in your OR. Featuring versatile equipment and intra-operative imaging interfaces to optimize your surgical experience.

StealthStation iNav® – This fee-per-use, portable system was designed so every hospital can offer the benefits of surgical navigation technology.

AxiEM Electromagnetic Navigation System – This unique, electromagnetic (EM) tracking technology provides tip-tracking of flexible surgical instruments.

Fusion™ ENT – This innovative EM surgical navigation system is accurate, easy to use, and expandable as needed.

StealthViz™ Planning Station – A powerful 2D/3D surgical planning application that simplifies advanced image viewing, processing, and morphing for navigation.

Frameless neuronavigation based on 3D-CTA (3D catheter angiography) registered by only the surface anatomy data contained within the 3D DSA image set. This is an easily applied technique that is beneficial for accurately locating vascular pathological entities and reducing the dissection burden of vascular lesions [1)].

While frameless stereotaxis can be used for shunt ventricular catheter placement in patients with smaller ventricles, the ventricular catheter is still commonly placed based on the surface anatomy of the head for patients with larger ventricles. Thus, surgical techniques and guides facilitating accurate and reliable freehand placement of the ventricular catheter still need to be devised.

Newer versions of the commercial Medtronic StealthStation allow the use of only 8 landmark pairs for patient-to-image registration as opposed to 9 landmarks in older systems. The choice of which landmark pair to drop in these newer systems can have an effect on the quality of the patient-to-image registration.

To investigate 4 landmark registration protocols based on 8 landmark pairs and compare the resulting registration accuracy with a 9-landmark protocol.

Four different protocols were tested on both phantoms and patients. Two of the protocols involved using 4 ear landmarks and 4 facial landmarks and the other 2 involved using 3 ear landmarks and 5 facial landmarks. Both the fiducial registration error and target registration error were evaluated for each of the different protocols to determine any difference between them and the 9-landmark protocol.

No difference in fiducial registration error was found between any of the 8-landmark protocols and the 9-landmark protocol. A significant decrease ($P < .05$) in target registration error was found when using a protocol based on 4 ear landmarks and 4 facial landmarks compared with the other protocols based on 3 ear landmarks.

When using 8 landmarks to perform the patient-to-image registration, the protocol using 4 ear landmarks and 4 facial landmarks greatly outperformed the other 8-landmark protocols and 9-landmark protocol, resulting in the lowest target registration error [2)].

Case series

2003

In 57 patients a stereotactic brain biopsy using a frameless neuronavigation system, the Stealth Station was performed. The supratentorial lesions had a mean diameter of 33 mm and a mean distance of 32 mm from the entry point at brain surface. In all cases the stereotactic procedure was planned in the preoperative 3-D magnetic resonance data set. In seven cases additional data for identification of eloquent brain areas was integrated from magnetoencephalography or functional magnetic resonance imaging. During surgery the samples were sent to neuropathological examination and the operation completed after the confirmation of pathological tissue. Using this method, in 56 cases a pathological tissue was obtained and a diagnostic yield of 98% was achieved. In two cases (3.5%) a new neurological deficit remained (hemiparesis and visual field deficit). The mean operation time was 92 minutes including examination of frozen sections. The results of our series demonstrate, that frameless stereotactic systems can also be reliably applied for biopsy of supratentorial lesions larger than 15 mm. Frameless stereotaxy in combination with intraoperative pathological confirmation is a safe and reliable method for stereotactic brain biopsy with a diagnostic yield comparable to frame-based stereotaxy [3)].

1)
Stidd DA, Wewel J, Ghods AJ, Munich S, Serici A, Keigher KM, Theessen H, Moftakhar R, Lopes DK. Frameless neuronavigation based only on 3D digital subtraction angiography using surface-based facial registration. J Neurosurg. 2014 Sep;121(3):745-50. doi: 10.3171/2014.6.JNS132386. Epub 2014 Jul 18. PubMed PMID: 25036204.
2)
Gerard IJ, Hall JA, Mok K, Collins DL. New Protocol for Skin Landmark Registration in Image-Guided Neurosurgery: Technical Note. Neurosurgery. 2015 Sep;11 Suppl 3:376-80; discussion 380-1. doi:

10.1227/NEU.0000000000000868. PubMed PMID: 26120798.
3)

Gralla J, Nimsky C, Buchfelder M, Fahlbusch R, Ganslandt O. Frameless stereotactic brain biopsy procedures using the Stealth Station: indications, accuracy and results. Zentralbl Neurochir. 2003;64(4):166-70. PubMed PMID: 14634881.