

COMPUTER-ASSISTED THERAPY AND NDI TECHNOLOGY



Figure 1

Computer-Assisted Therapy systems have enormous potential to improve the accuracy and recovery time of many surgical procedures. In surgeries ranging from tumor excision and herniated disk removal to the treatment of spinal disorders, the systems enhance a surgeon's work and can improve a patient's prognosis. In most cases, the incisions required for the operation would be much smaller, minimizing damage to healthy surrounding tissue and reducing the patient's recovery time.

Surgical procedures which can benefit from Computer-Assisted Therapy include:

- tumor excision
- herniated disk removal
- spinal joint fusing
- orthopaedic implants
- biopsy
- spinal screw insertion
- craniotomy
- deep brain stimulation

The position sensor is a critical component of any Computer-Assisted Therapy system. Current technologies for position sensors are mechanical, optical (NDI Polaris® and NDI Polaris Accedo™), and electromagnetic (NDI Aurora®). The NDI Polaris system is the optical system integrated into Computer-Assisted Therapy systems by most of the world's leading providers.

The following describes a typical Computer-Assisted Therapy (cranial) procedure utilizing a system that integrates the NDI Polaris system.

The Polaris Position Sensor is mounted in the operating room, strategically positioned to maximize the visibility of the tracked instruments used during the procedure. The patient's head is fixed in a Mayfield™ headframe (Figure 1).

After anaesthetization, the patient's physical position is "registered" to the acquired pre-operative MRI data by matching previously selected fiducial markers to their physical location on the patient. The Computer Assisted Therapy system's pointer simplifies this process and ensures accuracy. Once the registration is complete and approved by the surgeon, the patient is draped for surgery.



Figure 2

(continued on reverse)



Figure 3 - Navigational image produced by SNS Scout IGS application software.

The surgeon uses the Computer Assisted Therapy system when he or she plans the location and extent of the craniotomy. (For an example of a Computer Assisted Therapy software interface, see Figure 3). The medial, lateral, anterior, and posterior borders of the craniotomy are mapped by using the pointer and the orthogonal views.

Once the skin flap is secured, the Computer Assisted Therapy system is again used to confirm the co-ordinates and MRI data. The surgeon performs the craniotomy, dissecting the dura and excising the tumor. Since many surgeons feel that the brain shifts once the cranial cavity is opened, the use of Computer-Assisted Therapy is limited in this portion of the procedure.

NDI's Polaris hybrid system provides Computer Assisted Therapy suppliers a great deal of flexibility, tracking both active and passive tools with a high degree of accuracy. For more information on the use of NDI Polaris technology in Computer-Assisted Therapy, please contact NDI.

THE COMPANY

Established more than 20 years ago, NDI is trusted by international leaders in medicine, industry and research for the accuracy and reliability of its measurement technology. NDI systems are used in applications from computer-assisted therapy to aeronautics; from quality inspection to human motion research. Today, the company is a world leader in advanced 3D measurement technology with over 5,000 installations in more than 25 countries around the world.



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