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Total Knee Replacement - Computer-Navigated Orthopedic Surgery Solution in a Tri-State "First"

By Wayne Marnell

Significant recent advances in joint replacement surgery, such as minimally-invasive procedures, require the surgeon to use specialized techniques and instrumentation. Computer-assisted orthopedic surgery (CAOS) is a market whose growth is spurred on by the evolving surgical process and the surgeon's goal of ensuring the best patient outcomes. More precise placement of the implant means a longer-lasting joint, greater likelihood of restoring normal mobility, and a better quality of life for the patient.

On January 15, 2008, Dr. Michael J. Greller and fellow orthopedic surgeon and colleague Dr. Alan S. Nasar of Freehold, New Jersey, performed total knee replacement surgery using a fully cementless trabecular metal knee, assisted by a powerful, new, computerized navigational tool. This was the first time in the Tri-State area that an advanced navigation system was used to guide the precise alignment of the trabecular knee implant and ensure optimal movement and balance.

The total knee implant was the preferred joint replacement surgical option for a young, active, male patient and was performed at CentraState Medical Center in Freehold. Dr. Greller explained that the shorter incisions of minimally invasive surgical procedures used by the orthopedic surgeons at Advanced Orthopedics and Sports Medicine Institute reduce the visual access needed to position implants precisely. Computer-assisted orthopedic surgery uses computer imaging and tracking to guide the placement of the implant. Correct alignment of the implant with the upper and lower leg results in the best patient outcomes, fewer post-operative complications, less pain, less medication, and faster recovery. Implant misalignment, even if only by a few degrees, requires some patients to have additional surgery within a few years, either to reduce discomfort or to replace the worn implant. For most patients, the most dramatic benefit of a perfectly aligned implant is the return to normal mobility and an improved quality of life.

The navigation system software that performed so well for the surgeons provided implant-sizing information that allowed them to use the specific implant preferred for that particular patient. It assisted in determining the mechanical and rotational axis of the leg, ensuring exact placement of the implant. Dr. Greller praised the arrival of such an improved

navigational system. "Once the system was set up, it functioned flawlessly throughout the case and required no adjustment or fine tuning. The computer was able to learn the patient's anatomy in a few steps. The disposable reflectors called 'Navitrackers' are proprietary to Orthosoft, who developed the system, and replace the sometimes cumbersome spheres on other navigation system instruments we have used. The final result of the case was excellent. The x-rays looked perfect and the alignment was exact. The knee had great motion and was well balanced. We were able to implant the knee accurately with as few extra steps as possible."

This particular protocol is not for every patient. Every candidate for joint replacement surgery must be evaluated individually, considering various advanced components and techniques. The Zimmer trabecular implant was chosen in this instance for its superior resemblance--physically and mechanically--to healthy bone and its porosity which allows for greater bone in-growth. When guided into place with the assistance of the navigational software, the trabecular implant is allowed a bond to bone without cement, precisely placed, to ensure an excellent outcome for this particular patient. The patient's recovery is typically remarkable: faster recovery time and improved mobility. As advancements such as these used in this Tri-State "first-of-its-kind" knee surgery continue, fewer and fewer patients should have to live with knee pain.

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