What to expect from your
NAVIO® Robotics-assisted Partial Knee Replacement

Patient guide

The NAVIO Surgical System can help your surgeon **get you back in action** with accurate and precise partial knee replacement.

SAINT PETER'S UNIVERSITY HOSPITAL
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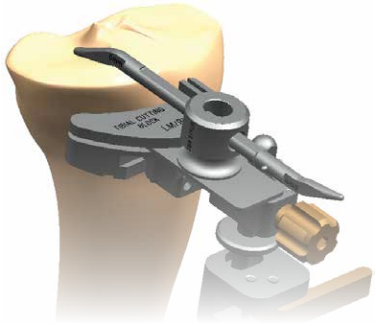
Partial knee replacement

Partial knee replacement is a potential alternative to total knee replacement for patients with early to mid-stage osteoarthritis that is generally limited to one compartment of the knee. The procedure removes and replaces the damaged portion of the knee with an implant, sparing the cruciate ligaments that are vital to knee stability, and preserving healthy bone and cartilage. In contrast to total knee replacement, partial knee replacement offers patients:

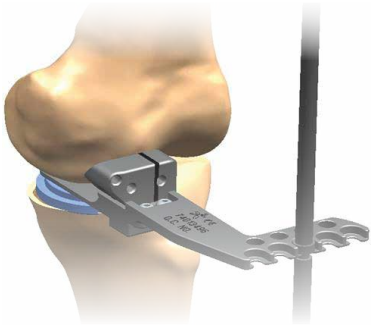
- Less pain[1]
- A more normal feeling knee[1]
- Smaller incisions[2]
- Quicker rehabilitation[1]

Partial knee replacement with traditional techniques

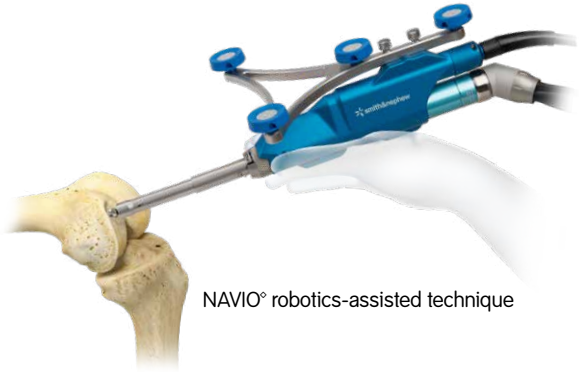
Using traditional surgical methods, cutting blocks or guides are placed on the thigh bone (femur) and shin bone (tibia) to help direct a surgical saw in removing the diseased bone and cartilage. This method has been considered technically challenging, as accurately placing these blocks can be difficult. In recent years, advanced surgical techniques using robotic assistance have been developed to provide a higher level of accuracy and precision.[3]



Shin bone (tibia) guide



Thigh bone (femur) guide



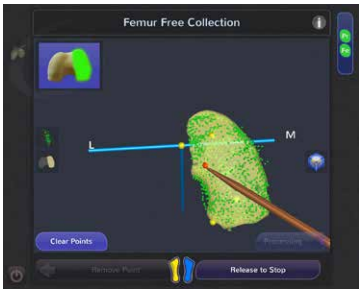
NAVIO® robotics-assisted technique

Partial knee replacement with NAVIO® robotic assistance

The NAVIO Surgical System provides robotic assistance through an advanced computer program that relays precise information about your knee to a robotics-assisted handpiece used by the surgeon during the procedure. By collecting patient-specific information, the surgeon is able to establish spacial boundaries for the robotics-assisted handpiece to assist in removing the damaged surfaces of your knee, balance your joint, and position the implant with accuracy and precision.[3]

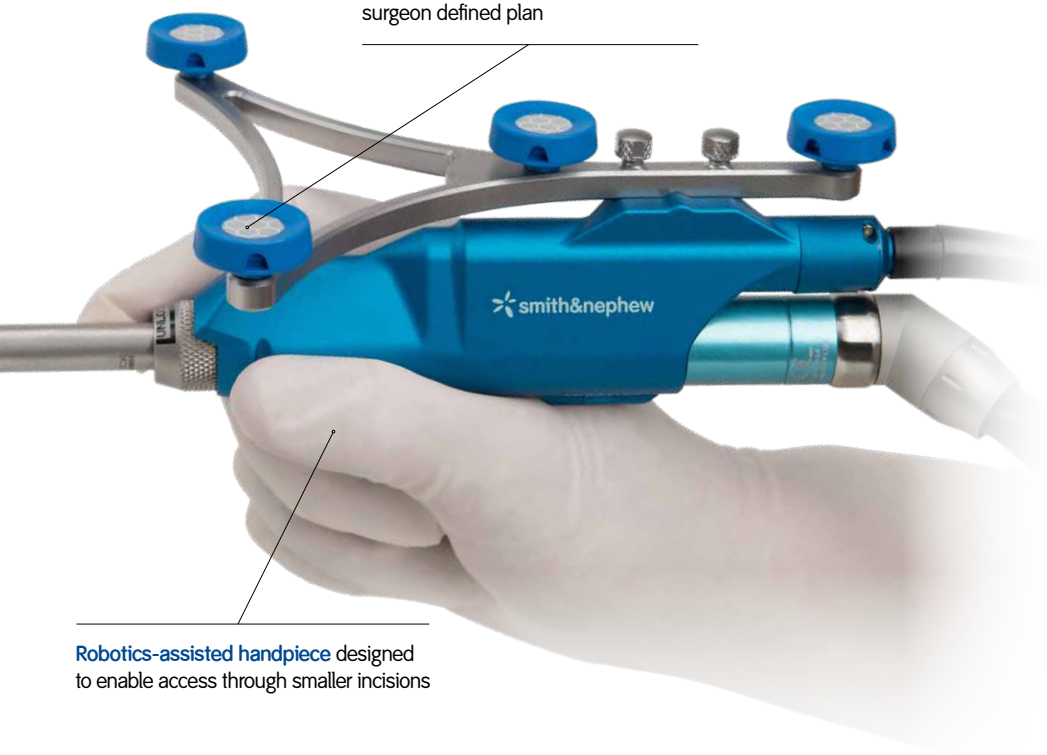
NAVIO Surgical System

Computer assistance designed to ensure consistent and accurate results



Advanced planning software allows the surgeon to tailor the procedure to each patient.

Advanced instrumentation designed to enforce bone resurfacing within the surgeon defined plan



Robotics-assisted handpiece designed to enable access through smaller incisions

Preparation

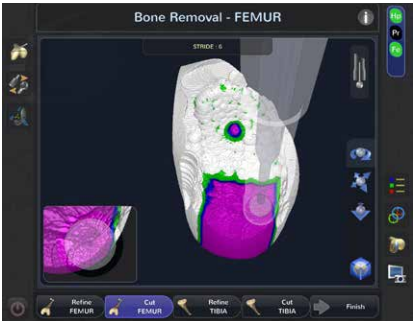
Follow your surgeon's instructions on how to prepare leading up to surgery. Some surgeons may request thorough medical and dental evaluations. Let your doctor know if you are taking any medications.

Consider how the surgery and recovery process will affect your daily activities. Move items and furniture in your home so they are easier to access while your mobility is limited. Remove clutter and obstacles that could be tripping hazards. Have a plan; preparing meals ahead of time and arranging visitors to help with everyday chores will make your recovery smoother.

What to expect in surgery

The surgeon will typically make a 4” - 6” incision along the front of your knee, just to the side of the knee cap, to access the damaged area and inspect the knee. Special trackers are secured to both the thigh bone (femur) and shin bone (tibia) with four, 4mm pins that are placed through small incisions in the skin. These trackers are crucial to the precision of the system as they provide a constant reference point for the computer navigation as the surgeon collects your anatomical data and prepares the joint surfaces.

The anatomical data collected is used to generate a 3-dimensional virtual model of your knee, which the surgeon uses to precisely plan your partial knee replacement. With the NAVIO® System, proper implant placement and knee balance, important to a successful surgery, are first achieved virtually.



When the surgical plan is set, the NAVIO system’s robotics-assisted handpiece is used by the surgeon to accurately resurface the joint as he or she guides the instrument over the damaged femoral and tibial bone. After the damaged bone and cartilage have been removed and the implants are in place, the incision is thoroughly cleaned and closed to complete the procedure.

Postoperative

Immediately after surgery you will be transferred to the recovery room. In addition to the incision along your knee, there will be two small incisions on both your thigh and lower leg where the tracker pins were placed. Ice packs and analgesics may be used to reduce swelling and manage pain.

Each patient's postoperative care will vary, as severity of injury, surgeon care and other factors can vary. Early movement of your operative knee with assistance is encouraged. Patients are typically allowed to walk with the assistance of a cane, crutches – or walker shortly after surgery. A physical therapist will prescribe exercises to help restore knee strength and function, and increase range of motion. It is common for your knee to experience swelling, stiffness and tightness. Follow up visits may be scheduled to check up on your condition and progress as you recover.

Your surgeon will instruct you when it's appropriate to return to various activities. How quickly you recover depends on factors such as knee pain, flexibility, strength, and balance.

Complications

As with any surgical procedure there are risks involved with partial knee replacement which may include, but are not limited to:

- **Blood clots:** Your physician may prescribe medication to help prevent blood clots.
- **Infection:** Antibiotics may be given before surgery and continued afterward to help prevent infection.
- **Injury to nerves or vessels:** While rare, nerve and blood vessel damage may occur during the procedure.[4]
- **Other risks:** Individual patient risks should be discussed with your surgeon.

Disclaimer

The NAVIO® system is not for everyone. Children, pregnant women, patients who have mental or neuromuscular disorders that do not allow control of the knee joint and morbidly obese patients should not undergo a NAVIO procedure. Knee replacement surgery is intended to relieve knee pain and improve knee functions. However, implants may not produce the same feel or function as your original knee. There are potential risks with knee replacement surgery such as loosening, fracture, dislocation, wear and infection that may result in the need for additional surgery. Longevity of implants depends on many factors, such as types of activities and weight. This information, including postoperative care, is provided for educational purposes only. Smith & Nephew does not provide medical advice. In no event shall Smith & Nephew be liable for any damages whatsoever arising out of the use of or inability to use the expressed views. Consult your surgeon for details to determine if a NAVIO robotics assisted procedure is right for you.

The NAVIO system is intended to assist the surgeon in providing software-defined spatial boundaries for orientation and reference information to anatomical structures during orthopedic procedures. The NAVIO system is indicated for use in surgical knee procedures, in which the use of stereotactic surgery may be appropriate, and where reference to rigid anatomical bony structures can be determined. These procedures include unicondylar knee replacement (UKR), patellofemoral arthroplasty (PFA), and total knee arthroplasty (TKA). The NAVIO system is indicated for use with cemented implants only.

"I feel like I can enjoy my life again. I just wish I hadn't waited so long."

- Maria Leticia Duarte
NAVIO Partial Knee Patient

1 Hall et al., "Unicompartmental Knee Arthroplasty (Alias Uni-Knee): An Overview With Nursing Implications," Orthopaedic Nursing, 2004; 23(3): 163-171.

2 Repicci, JA, et al., "Minimally invasive surgical technique for unicondylar knee arthroplasty," J South Orthopedic Association, 1999 Spring; 8(1): 20-7.

3 Lonner, et al. "High Degree of Accuracy of a Novel Image-free Handheld Robot for Unicondylar Knee Arthroplasty in a Cadaveric Study." Clinical Orthopaedics and Related Research. Advanced online publication. DOI 10.1007/s11999-014-3764-x5 American Association of Orthopaedic Surgeons (2014). AAOS.org.

4 American Association of Orthopaedic Surgeons (2014). AAOS.org

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