MAKOplasty® Partial Knee Resurfacing is an advanced minimally invasive treatment option for adults suffering from osteoarthritis (OA) in one or two compartments of their knee. It is the only truly patient-specific procedure, planned and performed from a 3-D model of your knee. MAKOplasty is powered by the proven, highly accurate RIO® Robotic Arm Interactive Orthopedic System, which allows surgeons to achieve consistently reproducible results so you can return to an active lifestyle.
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The information provided herein assumes in every case an in-depth consultation between the healthcare practitioner and the patient considering MAKOplasty. Only a licensed physician can adequately diagnose and explain an underlying orthopedic condition, the natural progression of the condition without intervention, the potential clinical benefits of the MAKOplasty procedure, medically acceptable alternative procedures, and the potential complications and risks of any procedure and/or operation. MAKOplasty is not for everyone. The physician is at all times responsible for carefully selecting MAKOplasty patient candidates and guiding them on all aspects of surgery, including pre- and post-operative care. Individual clinical results will vary.

All claims of product performance and indications for use contained within this document relate only to data submitted to and reviewed by regulatory authorities in those jurisdictions in which clearance(s) and/or approval(s) have been obtained, including the United States. No product performance claims or indications for use are made for jurisdictions in which such clearance(s) and/or approval(s) have not been obtained.
Your surgeon has determined that you are a candidate for MAKOplasty Partial Knee Resurfacing. This guide was designed to provide information about MAKOplasty and what to expect before and after the procedure. This information is not meant to substitute for consultations with your orthopedic surgeon and his or her staff.

MAKOplasty is designed to relieve the pain caused by joint degeneration due to osteoarthritis (OA). By selectively targeting only the diseased part of your knee, your surgeon can spare healthy bone, tissue, and ligaments. Other benefits may include a smaller incision, shorter hospital stay, less pain, reduced blood loss, less scarring, more rapid recovery, and the ability to return to an active lifestyle quickly.

MAKOplasty is indicated for patients suffering from osteoarthritis in one or two compartments of their knee. A total knee replacement is sometimes necessary if your surgeon discovers during surgery that your knee has more damage than originally seen in the pre-operative X-rays and CT scan.

MAKOplasty – A Less Invasive Procedure
MAKOplasty is enabled by robotic arm technology that allows the surgeon to perform the procedure accurately through a smaller incision when compared to standard manual procedures. Surgeons use the RIO® Robotic Arm Interactive Orthopedic System, a surgeon-controlled robotic arm system that combines computer imaging with intelligent instrumentation. This allows the surgeon to more accurately place the implant that has been selected for your knee.

MAKOplasty can be performed through a four to six inch incision over your knee, with small incisions to access both your femur (thighbone) and tibia (shin). By preserving healthy bone, tissue, and ligaments, along with more accurate implant positioning, you can expect a more natural feeling knee.

Since healthy bone is preserved, patients who undergo MAKOplasty partial knee procedures may still be candidates for a total knee replacement procedure later in life if necessary. Your surgeon should discuss the specific risks associated with MAKOplasty and other treatment options with you. In addition, you should be informed of any pre-operative and post-operative instructions.
Results of several studies demonstrate the clinical benefits of robotic arm assisted MAKOplasty® Partial Knee Resurfacing

• Initial results of an ongoing study found MAKOplasty resulted in more accurately placed implants and less pain for the first eight weeks after surgery when compared with patients receiving manually placed implants. Comparing American Knee Society Scores, a common measure of knee functionality, the study also found MAKOplasty patients had increased post-operative functionality at three months post-surgery.1

• A study evaluating two-year implant failure rates found that MAKOplasty Partial Knee Resurfacing demonstrated low failure rates at two years.2

• A study comparing MAKOplasty Partial Knee Resurfacing with total knee arthroplasty found that MAKOplasty demonstrated improved function, better post-operative range of motion, and better quadriceps strength.3

MAKOplasty – Potential Benefits

Through the use of advanced robotic arm technology, MAKOplasty Partial Knee Resurfacing enables surgeons to:

• Very accurately resurface only the arthritic portion of the knee
• Preserve healthy tissue and bone
• Facilitate optimal implant positioning

For patients, this can mean a more rapid recovery than total knee replacement, and a more natural feeling knee following surgery.
Before Your MAKOplasty® Surgery

It is important that you take care of your health as best as possible prior to your MAKOplasty procedure. This may involve losing weight or starting an exercise program prior to your surgery. If you smoke, your physician may ask you to stop smoking so that your body can heal properly following surgery, as tobacco products can rob your body of oxygen supply that may be needed to facilitate healing.

Remember to inform your surgeon and anesthesiologist of any medications you may be currently taking. You may be advised to stop taking estrogen, aspirin, Vitamin E, anti-inflammatories, NSAIDs, or herbal supplements before surgery.

Your surgeon will schedule a CT scan prior to your surgery date. Data from this scan will be used to plan implant placement specifically to fit your knee.

Remember not to eat or drink anything after midnight the night before your surgery unless otherwise instructed. You may be advised to take any necessary medication with a sip of water the morning of surgery, but always confirm this with your surgeon. Do not use alcohol or sedatives 24 hours before surgery.

MAKOplasty Procedure

CT Scan

Patient-specific Planning

Precision Sculpting
You will be admitted to the hospital the day of your surgery. You will be asked to sign consent forms and have your leg shaved for surgery. Before the surgery begins, you will be visited by an anesthesiologist to discuss the type of anesthesia you will receive. An intravenous (IV) line will be started in your arm followed by pre-operative antibiotics and medicine that will make you drowsy. You will then be taken into the operating room for surgery.

During surgery your anesthesiologist will carefully monitor your blood pressure, pulse, temperature, and level of oxygen intake. Additional monitoring of the heart and lungs may be required. Your anesthesiologist will discuss all of this with you prior to surgery and will determine what is needed based on your personal health history.

If your MAKOplasty procedure is performed as an inpatient procedure, your hospital stay will normally range anywhere from one to three nights. Personal articles and clothing may be limited to what will fit into a single suitcase. Here are some helpful packing tips to help make your stay as pleasant as possible:

- Pack only the things you will need while in the hospital
- Pack loose fitting clothing and shoes with non-skid soles for your trip home
- If you prefer a special type of soap or hair product, remember to pack it
- Pack your own electric razor or battery-operated appliance as the hospital does not provide these items
- Bring any prescribed medications you will need during your hospital stay in the original containers so they can be identified by the hospital pharmacist and authorized by your surgeon
- Do not bring money, jewelry, credit cards, or any other valuables to the hospital

What can I expect?

MAKOplasty is most often performed as an inpatient procedure, but may be done on an outpatient basis depending on what your surgeon determines is right for you. Hospital stays average anywhere from one to three days; ambulatory patients may return home the same day.

In many cases, patients are permitted to walk soon after surgery, drive a car in the first few weeks, and return to normal daily activities shortly thereafter. Your recovery therapy and restrictions will be discussed with you by your surgical team.
Your initial recovery after surgery will begin in a post-anesthesia care unit (PACU), where you will be closely monitored while you wake up and begin to recover from the anesthesia. You will awaken in the recovery room with a dressing and ace bandages on your leg from your toes to upper thigh. You may also have a thin tube inserted into the surgical site that will be attached to a drain. This tube will collect any fluid that accumulates under the skin and muscle, and at the discretion of your surgeon will most likely be removed 48 hours following surgery. An ice wrap may be used to reduce swelling and you will be medicated adequately for post-operative pain.

An anesthesiologist and registered nurses will also be in the PACU to monitor your recovery. Visitation in the PACU is limited in order to decrease the risk of infection, promote privacy for all patients, and enhance the healing process. Your leg may feel numb as local anaesthetic blocks were used.

Your Implants
The RESTORIS® family of implants is specially designed for MAKOplasty procedures. It enables the treatment of one or two compartments of an osteoarthritic knee.

Unicompartmental

Bicompartmental

Medial and Patellofemoral
Physical Therapy
If your surgeon prescribes physical therapy, a physical therapist may ask you to move your ankle joint, stand, and/or walk with the assistance of a walker or cane soon after surgery in order to prevent circulation problems and strengthen your muscles. Your surgeon may prescribe a CPM (continuous passive motion) machine.

Your post-surgical physical therapy program should continue shortly after your return home, and be conducted under your surgeon’s guidance and supervision. A typical physical therapy program following knee surgery includes isometric exercises that tighten the muscles around the knee without moving the joint in order for you to regain your mobility as soon as possible. Your therapist can show you appropriate ways to accommodate your daily lifestyle while you are recovering.

Recovery at Home
You may want to prepare your home before your surgery so it will be comfortable and safe when you return from the hospital. Think safety first by removing any hazards including floor rugs, loose phone lines, or cables and clutter that can cause you to slip or fall. To reduce unnecessary movement during the first few days following your return home, organize the items you’ll need on a daily basis within arm’s reach.

Your surgeon will determine when you will be able to return to work, drive a car, or do low-impact aerobic exercises such as walking, golfing, bowling, or swimming. Jogging and high-contact sports are not recommended. You should follow your surgeon’s instructions and advice post-surgery. It is common to experience swelling in the knee, heaviness, and tightness for several weeks. A tourniquet is commonly used during surgery to minimize blood loss and this may lead to some upper thigh discomfort. You will notice two small extra skin incisions where the trackers for the robotic arm system were placed.

Moving about in accordance with your surgeon’s instructions, with your cane, crutches, or walker will gradually increase your activity level to help you heal and feel better.

- Practice walking, first around your home and later outside.
- You should be able to resume most light activities within three to six weeks.
- It is important to follow the exercise program developed by your physical therapist diligently. This will help your muscles regain mobility and strength, allowing you to walk normally again.

Ask Your Surgeon About Self Care

- Before your surgery, arrange for assistance you may require from others after surgery.
- Eat a balanced diet, take any vitamin or iron supplement your surgeon recommends and be sure to drink plenty of fluids. Good nutrition may help your tissue heal and your muscles regain strength.
- Engage in low stress activities that do not put any pressure on your knee, as guided by your surgeon. Low stress activities may include golfing, hiking, walking, biking, and swimming.
Q: Is MAKOplasty® covered by health insurance providers?
A: As a knee replacement procedure, MAKOplasty is typically covered by Medicare and most private insurance carriers. Check with your private health insurance to verify your specific coverage.

Q: How long has the MAKOplasty procedure been available?
A: MAKO’s robotic arm technology was cleared by the U.S. Food and Drug Administration (FDA) in 2005. The first MAKOplasty procedure was performed in June of 2006.

Q: Does the robotic arm system actually perform the surgery?
A: No, MAKOplasty is performed by an orthopedic surgeon, who uses the surgeon-controlled robotic arm system to pre-plan the surgery and to accurately resurface the bone with consistently reproducible precision. The robotic arm does not perform the surgery nor can it make decisions on its own or move in any way without the surgeon guiding it. During surgery, RIO® provides the surgeon with real-time visual, tactile, and auditory feedback to facilitate optimal joint resurfacing and implant positioning. It is this optimal placement that can result in more natural knee motion following surgery.

Q: What is the difference between MAKOplasty and traditional knee replacement surgery?
B: Unlike manual surgery, MAKOplasty provides consistent and reproducible accuracy through the use of RIO and the contouring design of RESTORIS® implants. Compared to total knee replacements, MAKOplasty preserves healthy bone, soft tissue, and ligaments which allows for an overall less invasive procedure, more rapid recovery, shorter hospital stay, and more natural knee function.

Q: What is the lifespan of a MAKOplasty implant?
A: All implants have a life expectancy that depends on several factors including the patient’s weight, activity level, quality of bone stock, and compliance with their surgeon’s orders. Proper implant alignment and precise positioning during surgery are also very important factors that can improve the life expectancy of an implant.

2. Roche MW, Coon T, Pearle AD, Dounchis J. Two year survivorship of robotically guided medial MCK onlay. 25th Annual Congress of ISTA, October 3-6, 2012, Sydney, Australia.
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