

A New Knee for a More Active You

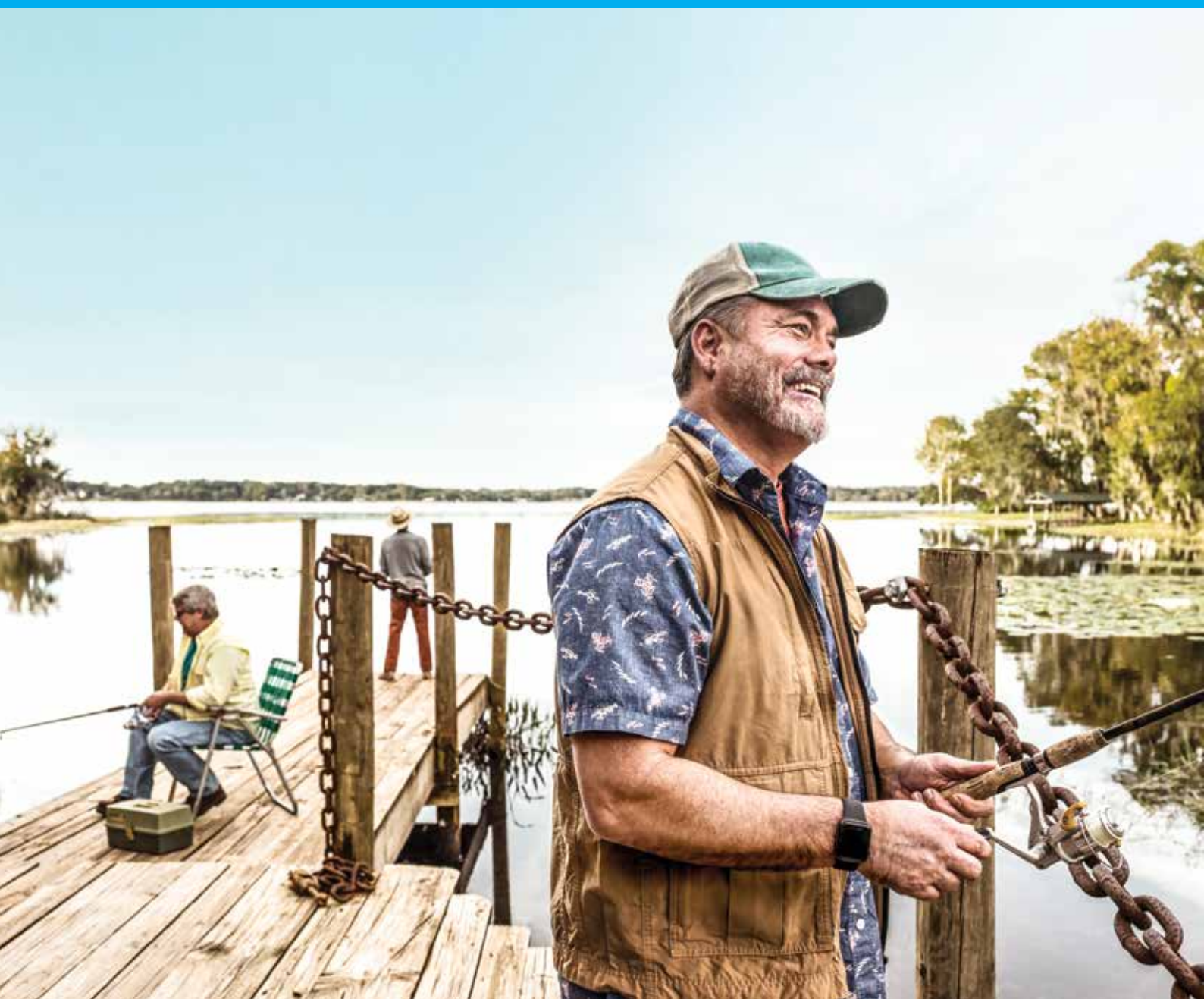


ROSA[®]
ROBOTICS
for Knee Replacement



Understanding Robotic Knee Replacement

You're unique, and so is your individual anatomy. That's why Zimmer Biomet offers ROSA® Robotics technology. ROSA, Robotic Surgical Assistant, is designed to help your specially-trained surgeon tailor the placement of your knee implant just for you. Here, we will explain what makes the ROSA Robotics System unique, what to expect preoperatively, what will happen with the ROSA robot during surgery and what to expect after your surgery.



Osteoarthritis

Healthy joints are covered by a layer of cartilage which is a tough, lubricating tissue that provides smooth, pain-free motion to your joints. Arthritis, or joint inflammation, can be an extremely painful and difficult condition to manage.

When arthritis develops, the cartilage becomes thinner and eventually wears away down to the bone. This is called osteoarthritis. This type of arthritis results in bone against bone friction. Without cartilage, walking is painful.

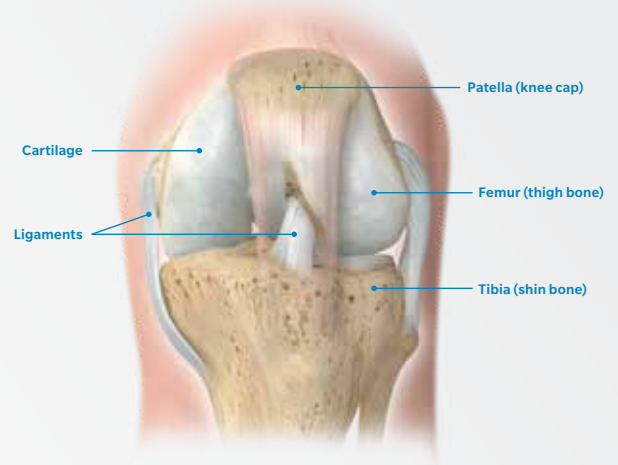


Figure 1
Normal Knee



Figure 2
Osteoarthritis on one side
Partial Knee Candidate



Figure 3
Osteoarthritis on both sides
Total Knee Candidate

Symptoms of osteoarthritis can include:

- Painful joints, especially after activity or periods of inactivity
- Joint stiffness
- Joint swelling
- Loss of movement in the joint

What is **Total Knee Replacement**?

The knee joint is one of the largest and most complex joints in the body. It consists of three parts that move and work together to ensure smooth motion and function. The knee is made up of the lower end of the thigh bone (femur), which rotates on the upper end of the shin bone (tibia), and the kneecap (patella) (Figure 4), which slides in a groove on the end of the femur. Four large ligaments attached to the femur and the tibia provide stability. Total knee replacement removes the entire surface of the knee joint and replaces that surface with artificial parts. A total knee replacement consists of the following components (Figure 4):

- 1 The femoral component:**
a metal component on the end of the thigh bone
- 2 The tibial component:**
a metal component and plastic liner on the upper end of the shin bone
- 3 The patellar component:**
a plastic button on the kneecap

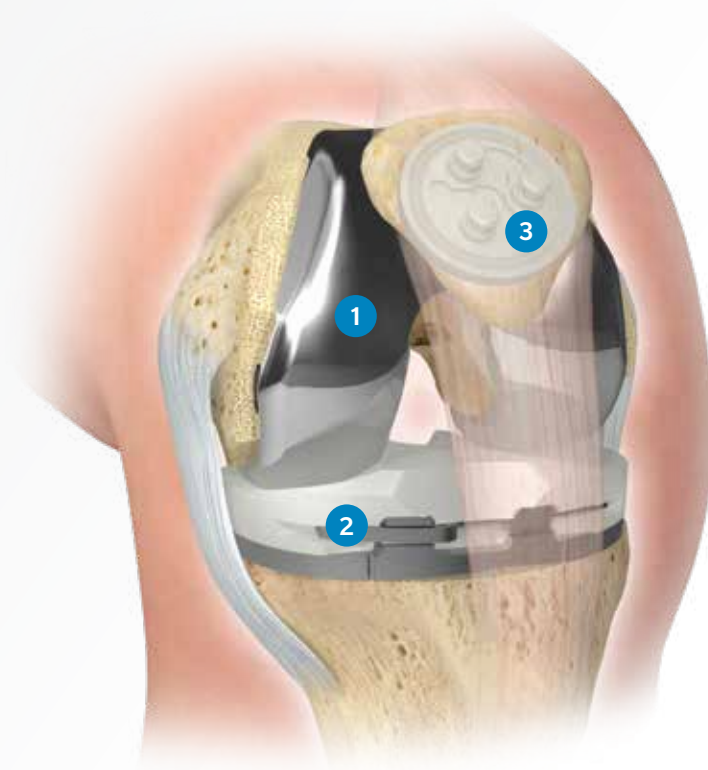


Figure 4. Example of a Total Knee Replacement

What is **Partial Knee Replacement**?

Often, only one side of the knee is damaged. This is usually the inner side of the knee, but although less common, arthritis can also affect the outer side of the knee.

A partial knee replacement, also known as a unicompartmental knee replacement, will replace only the damaged side of the knee (Figure 5), preserving the normal, undamaged cartilage. This may result in a smaller incision, keeping the four natural ligaments and an artificial joint which functions more like the natural knee movement.⁸

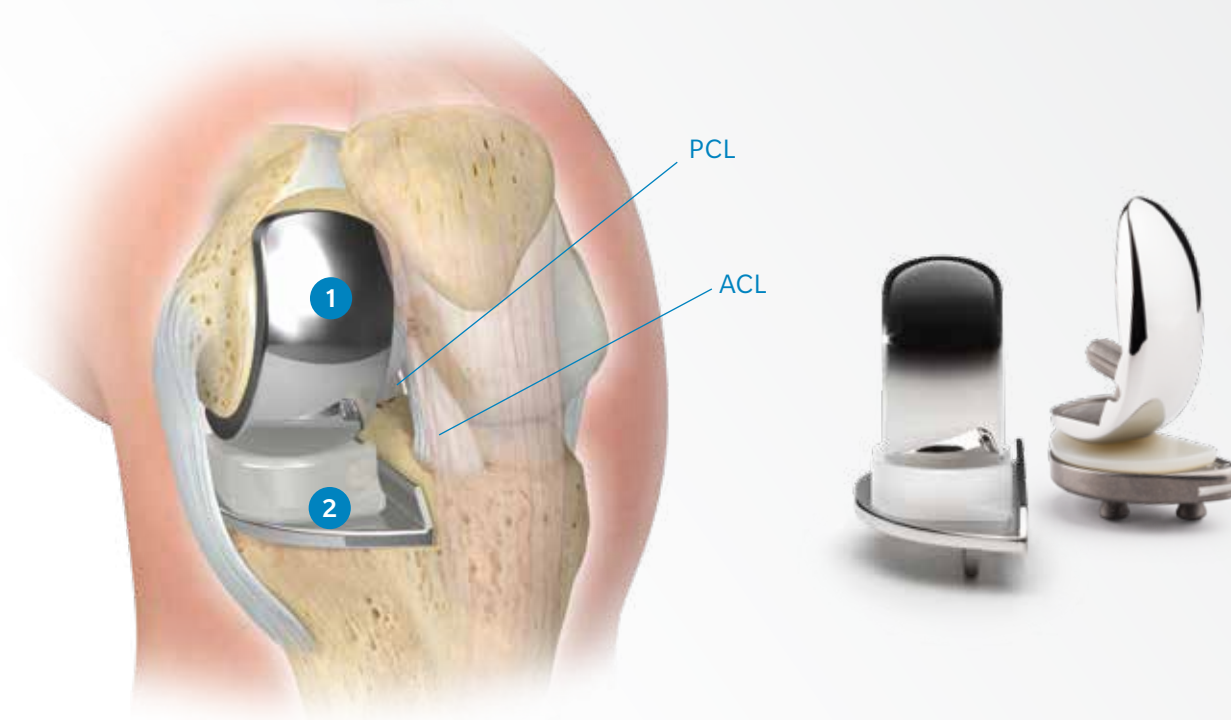


Figure 5. Example of a Partial Knee Replacement

What risks are involved? It is important to understand the risks involved. There are potential complications both during and after surgery. Generally, these include infection, blood clots, pneumonia, implant loosening, nerve damage, bone fracture and implant breakage; any of which can require additional surgery. While joint replacement is generally successful in lowering pain levels and increasing mobility, some patients will continue to experience pain and your doctor may permanently restrict certain activities that could damage and wear out your new knee parts. Ask your doctor to explain other surgery risks.

Ligament Preservation

By undergoing a partial knee replacement, the soft tissues, ACL (Anterior Cruciate Ligament) and PCL (Posterior Cruciate Ligament), are kept intact and are not removed. These ligaments help provide stability, balance, and maintain your natural movement after surgery.¹⁴ One study found that approximately 50% of knee replacement patients are potential candidates for partial knee replacement.⁸ With total knee replacement, the natural ligaments, the ACL and PCL, are often removed (Figure 4). The implant must then provide the stability to the knee instead of the natural ligaments. With modern materials, improvements in techniques and antibiotic therapy, total knee replacement can be a successful operation.

Before surgery

Your preoperative experience will be like that of most total knee patients. But, unlike traditional knee replacement methods, with ROSA Robotics, a series of x-rays may be used to create a three-dimensional (3D) model of your knee anatomy. This 3D model will enable the surgeon to plan many specifics of your knee replacement prior to your surgery.



During surgery

The surgical procedure using the ROSA robot is similar to traditional knee replacement, but with a robotic assistant. Your surgeon has been specially trained to use the ROSA robot in order to personalize the surgical approach for your unique anatomy. It's important to understand that the robot does not operate on its own. That means it does not move unless your surgeon prompts it to. Your surgeon is still in the operating room the entire time and is making all of the decisions throughout your surgery.

During your procedure, ROSA utilizes a camera and optical trackers attached to your leg to know exactly where your knee is in space. Think of it like a very detailed global positioning system (GPS) that you might use in your car. If your leg moves even a fraction of an inch, the robot can tell and adjusts accordingly. This helps ensure that the plan your surgeon put into place is executed as intended. Throughout your surgery, the ROSA robot provides your surgeon with data about your knee. This information, combined with your surgeon's skill, helps them know how to position your implant based on your unique anatomy.

After surgery

Following surgery, you will be hospitalized based upon the recovery plan your surgeon decides is best for you. This hospitalization may range from one to three days. Recovery time varies, but most people should be able to drive after two weeks, garden after three to four weeks, and golf after six to eight weeks. Your surgeon will tell you when and what activities you can return to, and what activities to avoid.

Benefits of Robotic Knee Replacement



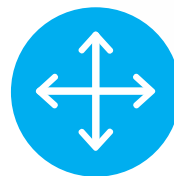
Patients can potentially **save money** on their ROSA robotic surgery as the system does not require the use of CT scans.



Less exposure to radiation^{reference}



Increased accuracy compared to traditional knee replacement^{reference}



Better implant positioning, which can result in a **more natural-feeling** knee after surgery



Potential for better **long-term satisfaction and outcomes**^{reference}

The decision to have surgery is sometimes difficult.

We hope this has helped you understand the ROSA Robotics System so that you can make the best decision for yourself. This information is not intended to replace the experience and counsel of your orthopedic surgeon. If you have any further questions, please speak with your orthopedic surgeon.



References

1. Parratte, S., et al. Accuracy of New Robotically-assisted Technique for Total Knee Arthroplasty: A Cadaveric Study. *The Journal of Arthroplasty*. 34(11): 2799-2803, 2019.
2. Seidenstein A, Birmingham M, Foran J, Ogden S. Better accuracy and reproducibility of a new robotically-assisted system for total knee arthroplasty compared to conventional instrumentation: a cadaveric study. *Knee Surg Sports Traumatol Arthrosc*. 2020 May 24. doi: 1007/s00167-020-06038-w. Epub ahead of print. PMID: 32448945. Cadaveric testing is not necessarily indicative of clinical performance.

To learn more about Zimmer Biomet joint replacements, obtain helpful information for patients and caregivers, or for assistance in finding a surgeon familiar with our products and surgical techniques, **call toll-free at 800-447-5633 or visit [zimmerbiomet.com](https://www.zimmerbiomet.com).**

This is intended to provide an overview of knee replacement surgery and should be reviewed with your doctor. It does not include all of the information needed to determine eligibility for knee replacement or for the proper use and care of artificial knee replacements. Please consult your surgeon for more information. Information may also be obtained by calling the toll-free number or visiting the website. The toll-free number can also be used to obtain complete product contraindications, warnings, precautions, and possible adverse effects. Individual results may vary. Your results will depend on your personal circumstances. How long a knee replacement will last varies from patient to patient. It depends on many factors, such as the patient's physical condition, activity level and body weight, and the surgical technique.

This device is available only on the order of a physician.

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