

References

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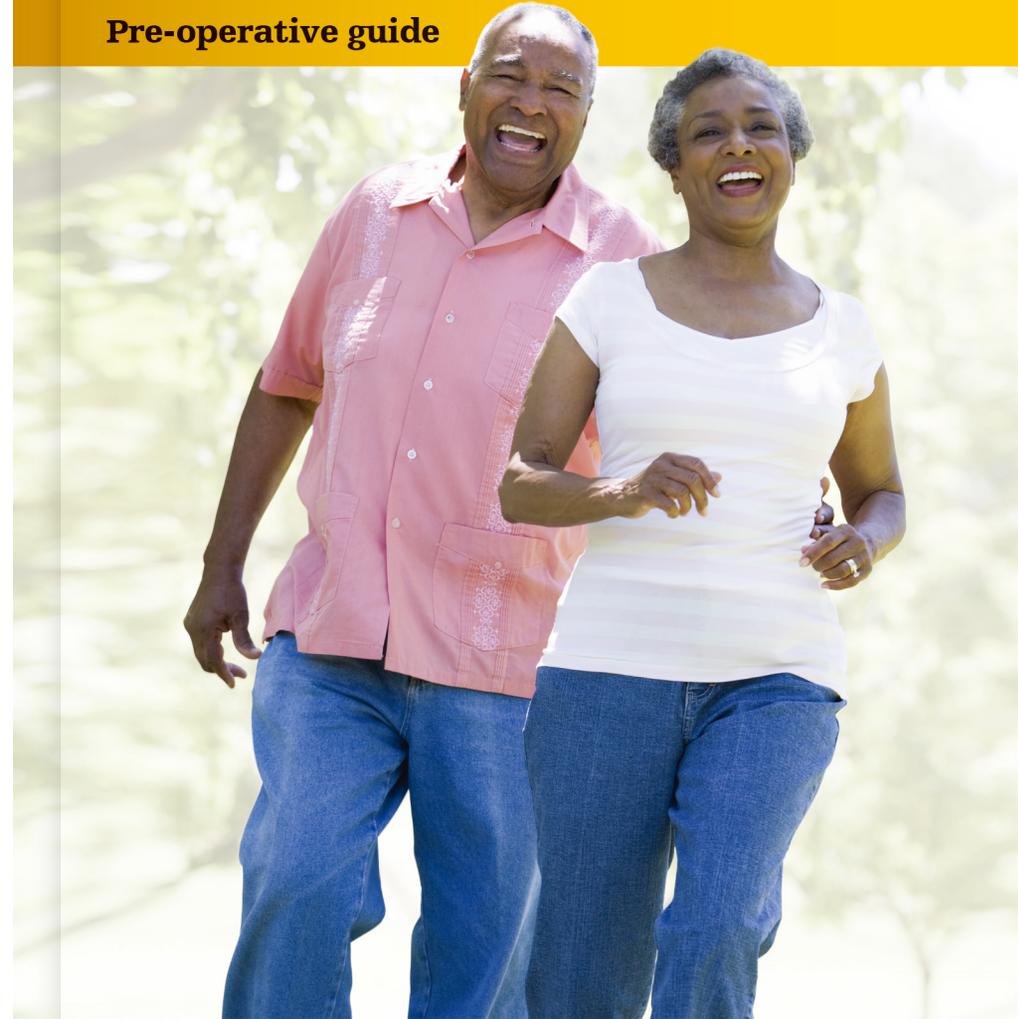
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Mako[®] Robotic-Arm Assisted Surgery

for total knee replacement

Pre-operative guide



 長安醫院
EVERANHOSPITAL

Getting back on the move

So, you've spoken to your orthopaedic surgeon about your knee pain, and decided to accept your surgeon's recommendation to undergo Mako Robotic-Arm Assisted Total Knee replacement. Mako Total Knee replacement is an option for adults suffering from osteoarthritis (OA) of the knee.

You're not quite sure what to expect from the surgical experience, but you do know that you don't want a one-size-fits-all solution to a problem that is very personal to you. It's your knee, your body. Mako Technology enables your surgeon to create a personalized surgical plan just for your knee.

This educational guide is designed to help you understand more about how to prepare and what to expect before, during and after your total knee replacement surgery.

Mako Total Knee replacement

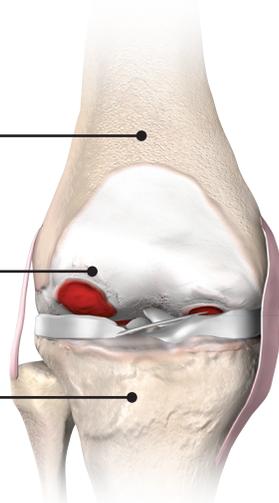
Mako Robotic-Arm Assisted Technology can be used for total knee replacement, which is a surgical procedure that helps relieve the pain caused by OA of the knee. OA is sometimes called degenerative arthritis because it is a "wearing out" condition involving the breakdown of cartilage in the joints. When cartilage wears away, the bones rub against each other, causing pain and stiffness.

An arthritic knee

Femur (thigh bone)

Diseased cartilage

Tibia (shin bone)



Important information

Knee replacements

General indications: Total knee replacement is intended for use in individuals with joint disease resulting from degenerative, rheumatoid and post-traumatic arthritis, and for moderate deformity of the knee.

Contraindications: Knee replacement surgery is not appropriate for patients with certain types of infections, any mental or neuromuscular disorder which would create an unacceptable risk of prosthesis instability, prosthesis fixation failure or complications in postoperative care, compromised bone stock, skeletal immaturity, or severe instability of the knee.

Common side effects of knee replacement surgery: As with any surgery, knee replacement surgery has serious risks which include, but are not limited to, peripheral neuropathies (nerve damage), circulatory compromise (including deep vein thrombosis (blood clots in the legs)), genitourinary disorders (including kidney failure), gastrointestinal disorders (including paralytic ileus (loss of intestinal digestive movement)), vascular disorders (including thrombus (blood clots), blood loss, or changes in blood pressure or heart rhythm), bronchopulmonary disorders (including emboli, stroke or pneumonia), heart attack, and death.

Implant related risks which may lead to a revision include dislocation, loosening, fracture, nerve damage, heterotopic bone formation (abnormal bone growth in tissue), wear of the implant, metal sensitivity, soft tissue imbalance, osteolysis (localized progressive bone loss), and reaction to particle debris. Knee implants may not provide the same feel or performance characteristics experienced with a normal healthy joint.

The information presented is for educational purposes only. Speak to your doctor to decide if joint replacement surgery is right for you. Individual results vary and not all patients will receive the same postoperative activity level. The lifetime of a joint replacement is not infinite and varies with each individual. Your doctor will help counsel you about how to best maintain your activities in order to potentially prolong the lifetime of the device. Such strategies include not engaging in high-impact activities, such as running, as well as maintaining a healthy weight. Ask your doctor if the Triathlon knee is right for you.

Tips for post-op care

1. Call your surgeon to report or discuss any post-op concerns.
2. Ask your doctor about how to care for the wound.
3. Ask your doctor about any unusual symptoms that you should look out for after surgery.

Frequently asked questions

Q: Is Mako covered by health insurance providers?

A: We understand that making sure your total knee replacement is covered by health insurance is important to you. Check with your health insurance provider to verify your specific coverage.

Q: How long has the Mako procedure been available?

A: The first Mako procedure was a partial knee replacement performed in June of 2006. Since that time, over 83,000 Mako hip and knee replacement procedures have been performed around the world.¹³

Q: Does the Mako Robotic-Arm actually perform surgery?

A: No, the robotic-arm doesn't perform surgery, nor can it make decisions on its own or move without the surgeon guiding it.

Q: How long do knee implants last?

A: Individual results vary and not all patients will have the same postoperative recovery and activity level. The lifetime of a knee replacement is not infinite and varies with each individual.

Did you know?

Knee replacement patients may return to driving in 4-6 weeks.¹⁴



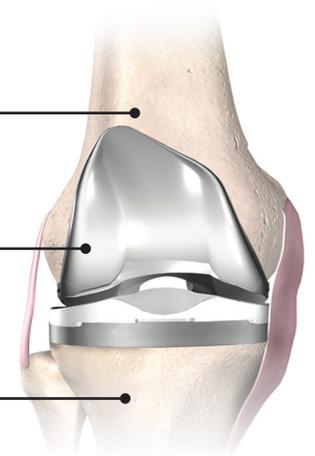
During surgery, the diseased or damaged joint is replaced with an artificial joint called an implant. Made of metal alloys and high grade plastics (to better match the function of bone and cartilage, respectively), the implant is designed to move much like a healthy human joint. Over the years, knee replacement techniques and instrumentation have undergone countless improvements. Mako Robotic-Arm Assisted Technology with Triathlon Total Knee implants is an example of how technology is transforming the way joint replacement surgeries are being performed.

A replaced knee

Femur (thigh bone)

Artificial knee implant

Tibia (shin bone)



When you hear 'robotic-arm assisted technology,' it's important to understand that the Mako Robotic-Arm doesn't actually perform the surgery. Surgery is performed by an orthopaedic surgeon, who uses the Mako System software to pre-plan your surgery. Your orthopaedic surgeon will guide the Mako Robotic-Arm to remove diseased bone and cartilage. Then the surgeon will insert a Triathlon Total Knee implant.

Mako Technology was designed to help surgeons provide patients with a personalized surgical experience based on their specific diagnosis and anatomy.

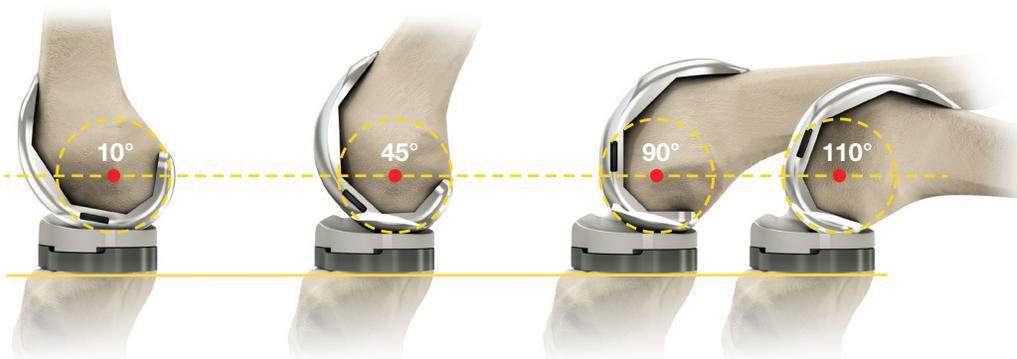
Did you know?

Approximately **705,000 total knee replacements** are expected to be completed in the U.S. in 2017.¹



Triathlon Total Knee implants

With over a decade of clinical history, Triathlon single-radius knees are different than traditional knee replacements because they are designed to work with the body to promote natural-like circular motion.²⁻⁵ This is due to the single radius design of the knee implant. Single radius means that as your knee flexes, the radius is the same, similar to a circle, potentially requiring less effort from your quadriceps muscle.^{4,6,7}



Since the thigh muscle (the quadriceps) is attached to your knee, it is unavoidably involved in the surgery. Therefore, the quadriceps muscle can become a source of discomfort or pain during your recovery period. The quadriceps muscle plays an important role in your ability to move your legs so it also has a major impact on your recovery and how quickly you can get back to living your life.⁸

Did you know?

2 million Triathlon Total Knees have been implanted worldwide since 2004.⁹



Recovering from surgery

Although the recovery process varies for each patient, here's what you might expect in the days following surgery.

- Your orthopaedic surgeon, nurses and physical therapist will closely monitor your condition and progress.
- When you are medically stable, the physical therapist will recommend certain exercises for the affected joint.
- To ease the discomfort the activity will initially cause, pain medication is recommended prior to therapy. Gradually, your pain medication will be reduced, the IV will be removed, your diet will progress to solids and you will become increasingly mobile.
- The physical therapist will discuss plans for rehabilitation following hospital discharge. Your physical therapist will also go over exercises to help improve your mobility.
- Depending on your limitations, an occupational therapist may provide instruction on how to use certain devices that assist in performing daily activities, such as putting on socks, reaching for household items, and bathing.
- A case manager will discuss plans for your return home and will ensure that you have all the necessary help to support a successful recovery.

Did you know?

Realistic activities following knee replacement include **walking, biking, swimming, golfing** and other low impact activities.¹²



The day of surgery

Every hospital has its own procedures, however, total knee replacement patients may expect their day-of-surgery experience to follow this basic routine:

- Arrive at the hospital at the appointed time
- Complete the admission process
- Final pre-surgery assessment of vital signs and general health
- Final meeting with anesthesiologist and operating room nurse
- Start IV (intravenous) catheter for administration of fluids and antibiotics
- Transportation to the operating room
- Joint replacement surgery
- Transportation to a recovery room
- Ongoing monitoring of vital signs until condition is stabilized
- Transportation to individual hospital room
- Ongoing monitoring of vital signs and surgical dressing
- Knee replacement recipients may use a continuous passive motion (CPM) machine to continuously bend and straighten the knee
- Pain management-your doctor may offer you pain medication to help you move around with less discomfort.
- Orientation to hospital routine
- Evaluation by physical therapist
- Diet of clear liquids or soft foods, as tolerated
- Begin post-op activities taught during preoperative visit

Risks and complications

As with any surgery, total knee replacement carries certain risks. Patients will need to modify their activities and not all patients will return to the same activity level. All surgery has serious risks including infection, heart attack, stroke, and death. Implant related risks that may lead to a revision include wear of the implant, dislocation, loosening, fracture, and nerve damage. The lifetime of any device is limited and depends on several factors like weight and activity level. Speak to your doctor and read the important information on page 11 of this booklet to understand all of the potential risks.

How Mako Technology works

1 Before surgery

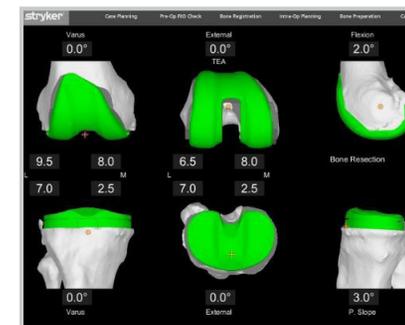
It all begins with a **CT scan** of your knee joint that is used to generate a 3D virtual model of your unique anatomy. This virtual model is loaded into the Mako System software and is used to create your **personalized pre-operative plan**.

2 In the operating room

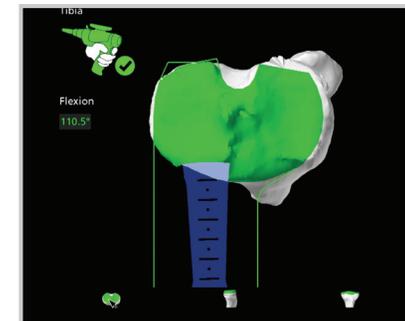
In the operating room, your surgeon will use the Mako System to assist in performing your surgery based on your personalized pre-operative plan. When the surgeon prepares the bone for the implant, the surgeon guides the robotic-arm within the predefined area and the Mako System helps the surgeon stay within the planned boundaries that were defined when the personalized pre-operative plan was created. The Mako System also allows your surgeon to make adjustments to your plan during surgery as needed. In a laboratory study, Mako Technology demonstrated accurate placement of implants to a personalized surgical plan.¹⁰ This study also showed that Mako Total Knee replacement demonstrated soft tissue protection to the ligaments around the knee.¹⁰

3 After surgery

After surgery, your surgeon, nurses and physical therapists will set goals with you to get you back on the move. They will closely monitor your condition and progress. Your surgeon may review a **post-operative x-ray** of your new knee with you.



1 Personalized pre-operative plan



2 Bone preparation

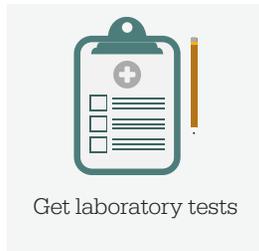
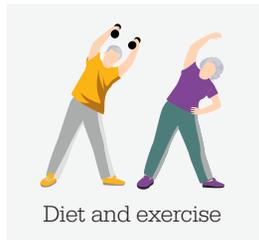


3 Post-operative x-ray

Preparing for surgery

Preparing for total knee replacement surgery begins weeks before the actual surgery. The checklist below outlines some tasks that your surgeon may ask you to complete in the weeks prior to your surgery date.

- Exercise under your doctor's supervision
- Have a general physical examination
- Have a dental examination
- Review medications
- Stop smoking
- Lose weight
- Arrange a pre-operative visit
- Get laboratory tests
- Complete forms
- Prepare meals
- Confer with a physical therapist
- Plan for post-surgery rehabilitative care
- Fast the night before
- Bathe surgical area with antiseptic solution



Did you know?

A **healthy diet can help patients heal** and **may reduce complications** associated with knee replacement surgery.¹¹



Tips for you and your caregiver

You may need assistance after surgery, so consider making arrangements with a caregiver before your surgery date. Your caregiver may be a family member or friend, and it is important to communicate with this person prior to surgery about how they can best help you when you return from the hospital. Below are some preparation tips for you and your caregiver to discuss with your doctor.

- 1** Encourage your caregiver to attend your pre-op & post-op appointments so they can talk to your doctor about how to best help you after surgery.
- 2** Ask what you can do to reduce unnecessary movement in the first few days following your return home. This may mean organizing the items you utilize on a daily basis within arm's reach.
- 3** Think safety first, and ask yourself whether you will need to remove floor rugs, loose phone lines, or cables and clutter that may cause you to slip and fall.
- 4** Ask if using a walking aid, such as a cane or walker, is appropriate for you to use after surgery.



Did you know?

A **physical therapist**

will work with your **orthopaedic specialist to recommend exercises** such as:

- **'Pushing'** or isometric exercises to help build muscle strength
- **'Pulling'** or isotonic exercises to further increase muscle strength and help preserve function
- **Daily walking**