stryker

Mako™ Robotic-Arm Assisted Surgery

for Total Hip Replacement

A Patient's Guide

Causes of Your

Hip Pain

Your joints are involved in almost every activity you do. Movements such as walking, bending and turning require the use of your hip and knee joints. When your hip becomes diseased or injured, the resulting pain can severely limit your ability to move and work.

One common cause of hip pain is Osteoarthritis (OA). OA is sometimes called degenerative arthritis because it is a “wearing out” condition involving the breakdown of cartilage and bones. With osteoarthritis, the cushioning cartilage at the end of the femur may have worn down, making walking painful as bone rubs against bone.

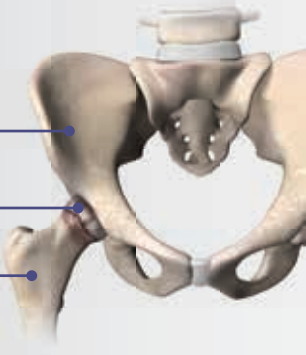
A Normal Hip

Pelvic Bone

Healthy Cartilage

Femur (thigh bone)

An Arthritic Hip



Pelvic Bone

Diseased Cartilage

Femur (thigh bone)

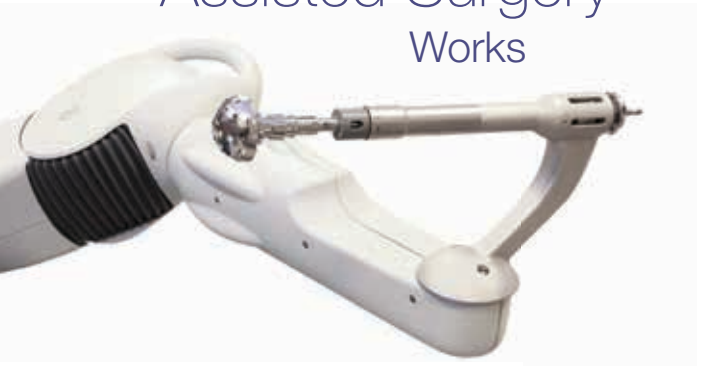
What is Hip Replacement Surgery?

Total Hip Replacement (THR) surgery involves the removal of arthritic bone and damaged cartilage, and replacing them with hip implants that are designed to replicate the hip joint.

During surgery, the end of the thighbone (femoral head) is replaced with a metal stem and an artificial ball that is secured to the top of the stem. The hip socket (acetabulum) is fitted with a metal cup that is lined with a durable plastic (polyethylene).

Stryker has worked with surgeons to develop innovative products to be utilized in total hip replacement. Mako robotic-arm technology can be used for total hip replacement, which is a procedure designed for patients who suffer from non-inflammatory or inflammatory degenerative joint disease of the hip. This technology provides your surgeon with a patient-specific 3D model to pre-plan your hip replacement. During surgery, your surgeon guides the Stryker robotic-arm based on your patient-specific plan. This helps the surgeon to focus on removal of diseased bone, helping preserve healthy bone, and assists your surgeon in positioning the total hip implant based on your anatomy.

How Mako Robotic-Arm Assisted Surgery Works



1

Have a Plan Personalized for You

It all begins with a CT scan of your 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

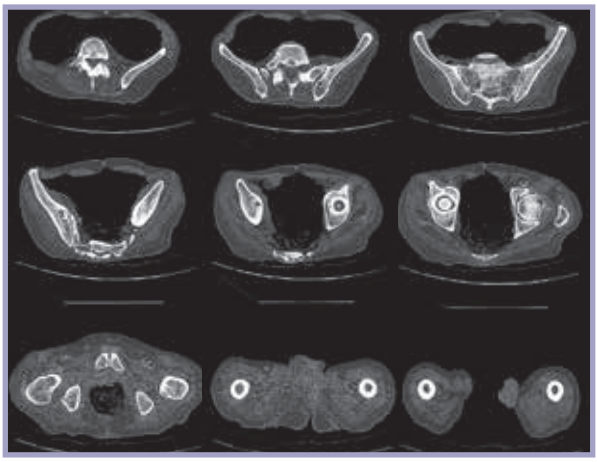
In the Operating Room

During surgery, the surgeon guides the robotic-arm while preparing the hip socket and positioning the implant based on your personalized pre-operative plan. The Mako system also allows your surgeon to make adjustments to your plan during surgery as needed. When the surgeon prepares the bone for the implant, the Mako system guides the surgeon within the pre-defined area and helps prevent the surgeon from moving outside the planned boundaries. This helps provide more accurate placement and alignment of your implant.[1,2]

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 an x-ray of your new hip replacement with you.



CT Scan

Personalized Planning

Post-Operative X-Ray

Frequently Asked Questions

Q: How long has the Mako procedure been available?

A: The first Mako procedure was performed in June of 2006.

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

A: No, surgery is performed by an orthopedic surgeon, who uses the surgeon-controlled robotic-arm system to pre-plan the surgery and to position the implant in the hip socket. 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. The Mako System also allows your surgeon to make adjustments to your plan during surgery as needed.

Q: How long do implants last?

A: Individual results vary and not all patients will have the same postoperative activity level. The lifetime of a hip 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.

A STUDY INDICATED THAT PATIENTS WHO UNDERGO HIP REPLACEMENT MAY RETURN TO DRIVING IN FOUR TO SIX WEEKS.[3]

What to Expect
in the Weeks Prior to Surgery

Preparing for total hip 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

It's Your Move.

Questions to Ask Your Doctor at Your Next Appointment

1. What are the benefits and potential risks involved with total hip replacement surgery?
2. How long does it typically take to recover from surgery?
3. Is osteoarthritis a factor in my hip pain?
4. Will reducing activity, taking pain or prescription medication, or adding physical therapy help ease my pain?
5. Could a total hip replacement help provide me with relief from my hip pain?
6. Am I a candidate for Stryker's robotic-arm assisted surgery?

IMPORTANT INFORMATION

Mako Hip Replacements

Hip joint replacement is intended for use in individuals with joint disease resulting from degenerative and rheumatoid arthritis, avascular necrosis, fracture of the neck of the femur or functional deformity of the hip.

Joint 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, severe instability of the joint, or excessive body weight.

Like any surgery, joint replacement surgery has serious risks which include, but are not limited to, pain, bone fracture, change in the treated leg length (hip), joint stiffness, hip joint fusion, amputation, 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 of the implant 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), audible sounds during motion, and reaction to particle debris.

The information presented is for educational purposes only. Individual results vary and not all patients will return to the same activity level. The lifetime of any joint replacement is limited and depends on several factors like patient weight and activity level. Your doctor will counsel you about strategies to potentially prolong the lifetime of the device, including avoiding high-impact activities, such as running, as well as maintaining a healthy weight. It is important to closely follow your physician's instructions regarding post-surgery activity, treatment and follow-up care.

REFERENCES

1. Nawabi DH, Conditt MA, Ranawat AS, Dunbar NJ, Jones J, Banks SA, Padgett DE. Haptically guided robotic technology in total hip arthroplasty - a cadaver investigation. Proc Inst Mech Eng H. 2013 Mar22 7(3):302-9.
2. Illgen R. Robotic assisted total hip arthroplasty improves accuracy and clinical outcome compared with manual technique. 44th Annual Advances in Arthroplasty Course. October 7-10, 2014, Cambridge, MA.
3. Marecek GS, Schafer MF. Driving after orthopaedic surgery. J Amerocan Academy of Orthopaedic Surgery. 2013 Nov;21(11):696-706.

Individual results vary. Not all patients will have the same post-operative recovery and activity level. See your orthopaedic surgeon to discuss your potential benefits and risks.

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