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Robotic Hip & Knee Replacement

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Medical School and Orthopedic Residency at Duke University

Fellowship Training in Hip & Knee Joint Replacement at Hospital for Special Surgery (HSS)

Understanding Joint Pain

Treatment Options

Conventional Joint Replacement

Robotic-Assisted Joint Replacement Surgery

Q&A

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What is arthritis?

Your hip and knee joints are involved in almost ***every activity*** you do.

A diseased or injured hip or knee can **limit** your ability to **move and work.**

Arthritis affects the lives of **54 million Americans**.

Common Causes Of Joint Pain

Rheumatoid arthritis (RA) - a condition in which a person's immune system attacks the joints with uncontrolled inflammation, potentially causing joint erosion.

Osteoarthritis (OA) - occurs when the cushioning cartilage at the end of the femur may have worn down, making walking painful as bone rubs against bone.

Post-traumatic arthritis - broken or fractured bone causes the surface to become uneven. Over time, friction causes the joint to break down and become arthritic.

What are treatment options for hip or knee osteoarthritis?

Non-surgical Treatment Options

Walking aids may allow you to put less pressure on the affected joint.

Heat or cold therapy can provide relief to an achy hip or knee joint.

Physical therapy can lessen your pain by teaching better posture or "form" for your day-to-day activities, like getting in and out of a chair.

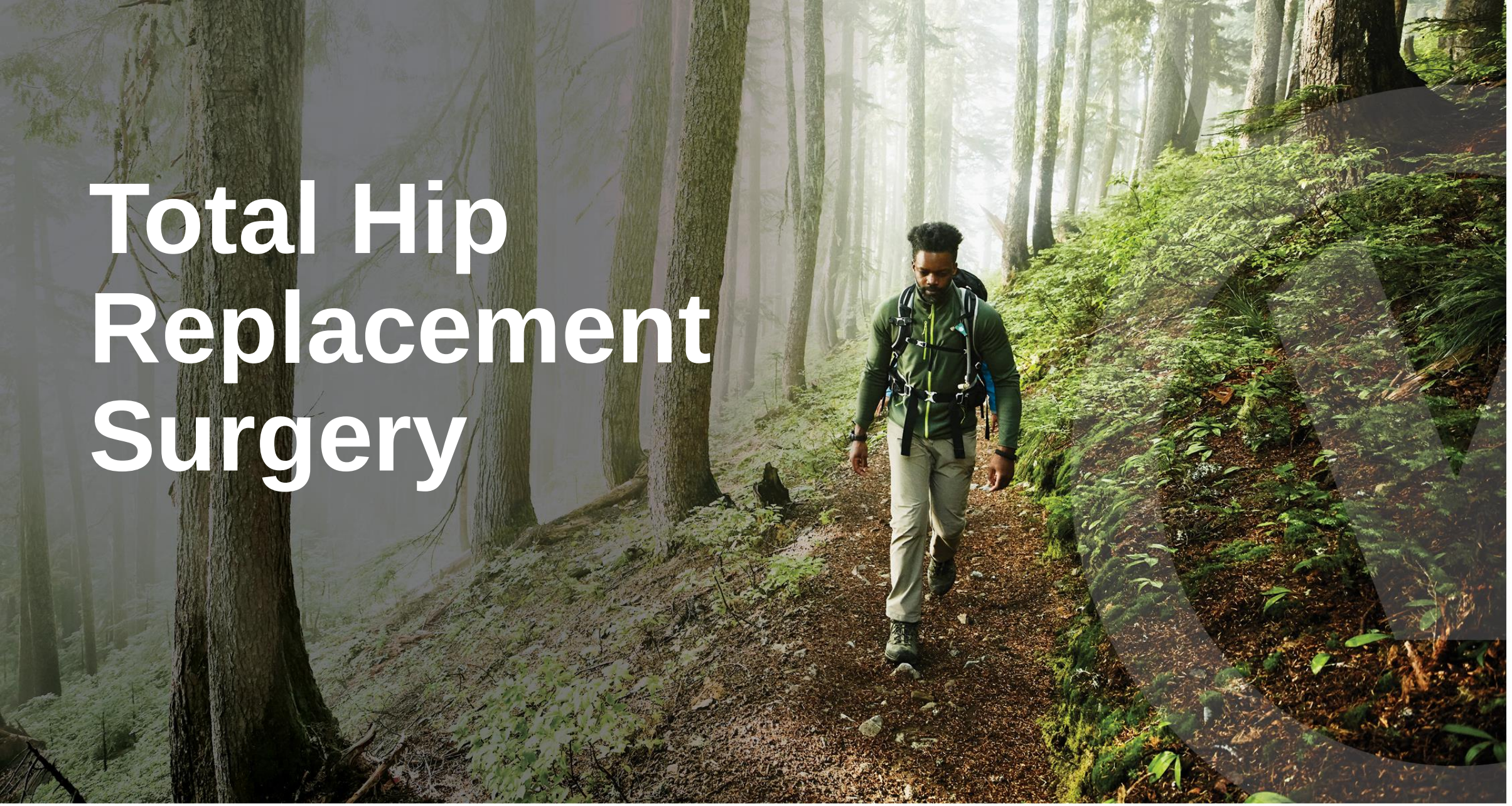
Over-the-counter or prescription anti-inflammatory medicines may help reduce pain and swelling. Non-steroidal anti-inflammatory drugs (NSAIDs), and steroid medications, like corticosteroids injections, may also be helpful. [6]

When To Consider Joint Replacement

Questions to ask yourself

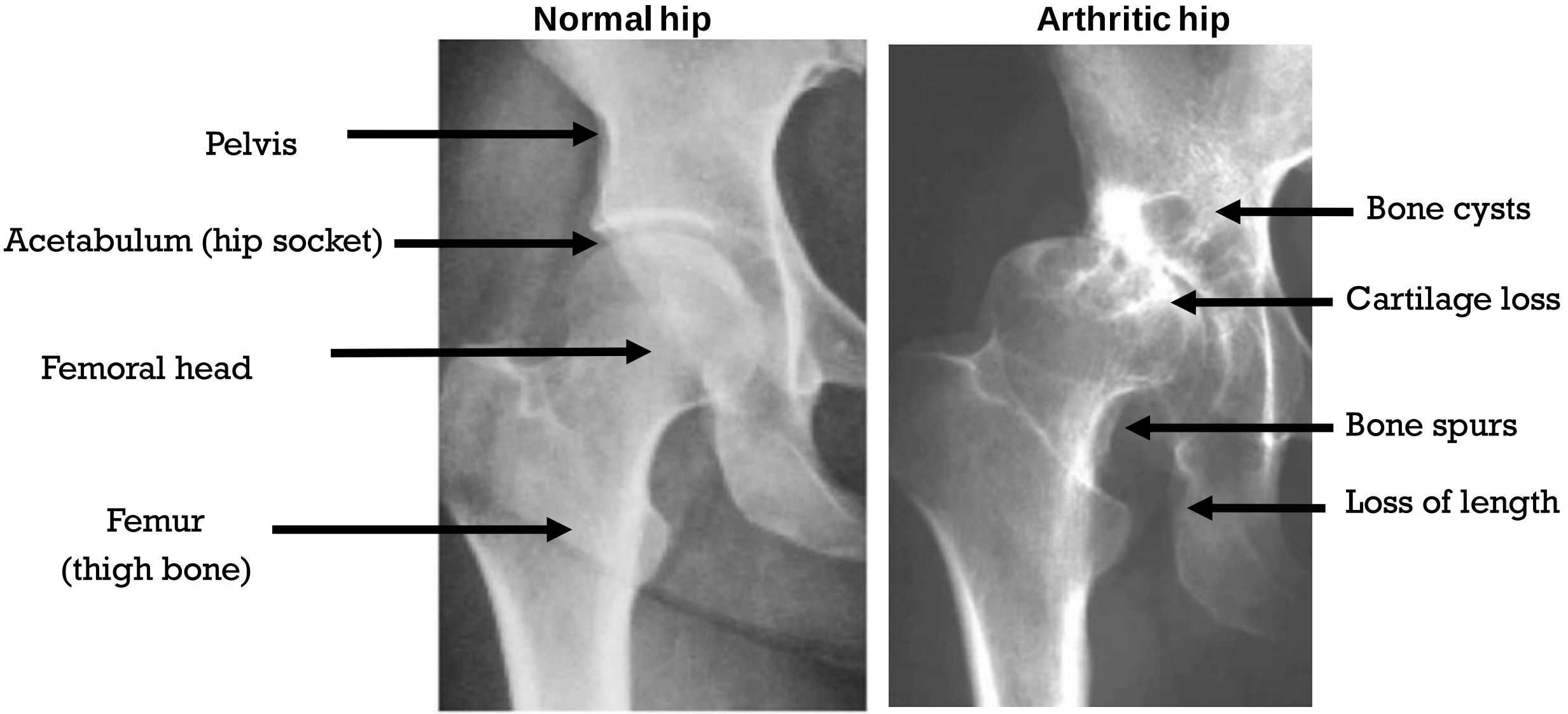
- ❑ Is joint pain affecting your ability to get a good night's sleep?
- ❑ Does joint pain keep you from doing things you want to do?
- ❑ Are you less active because of joint pain?
- ❑ Is joint pain affecting your ability to walk up stairs, uneven ground or long distances?

Total Hip Replacement Surgery



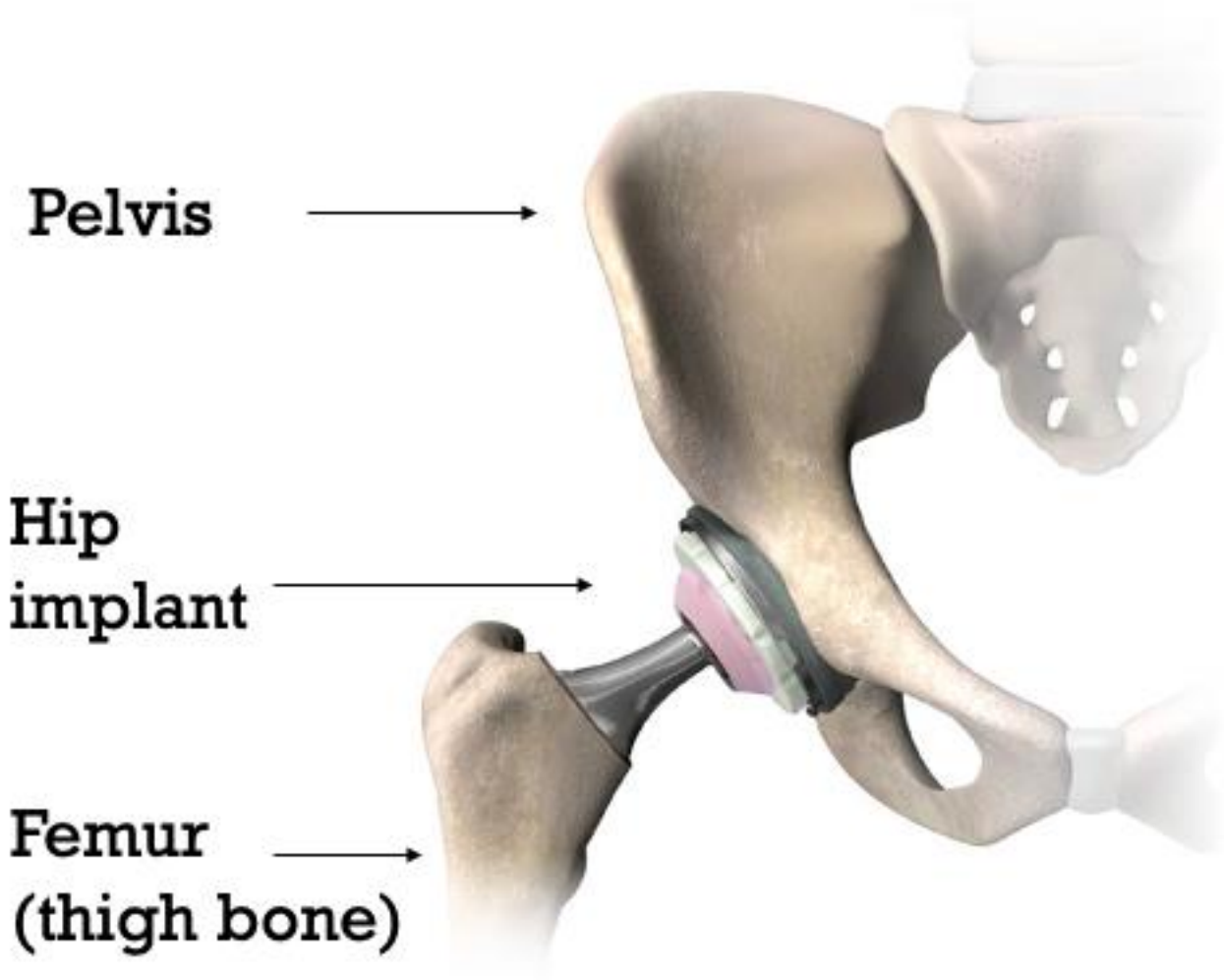
Arthritis is the most common cause of disability in adults

Hip anatomy



Hip Replacement
How It Works

Total hip replacement surgery involves the removal of arthritic bone and damaged cartilage. These are replaced by a hip implant made up of four primary parts: a stem, head, liner and cup.



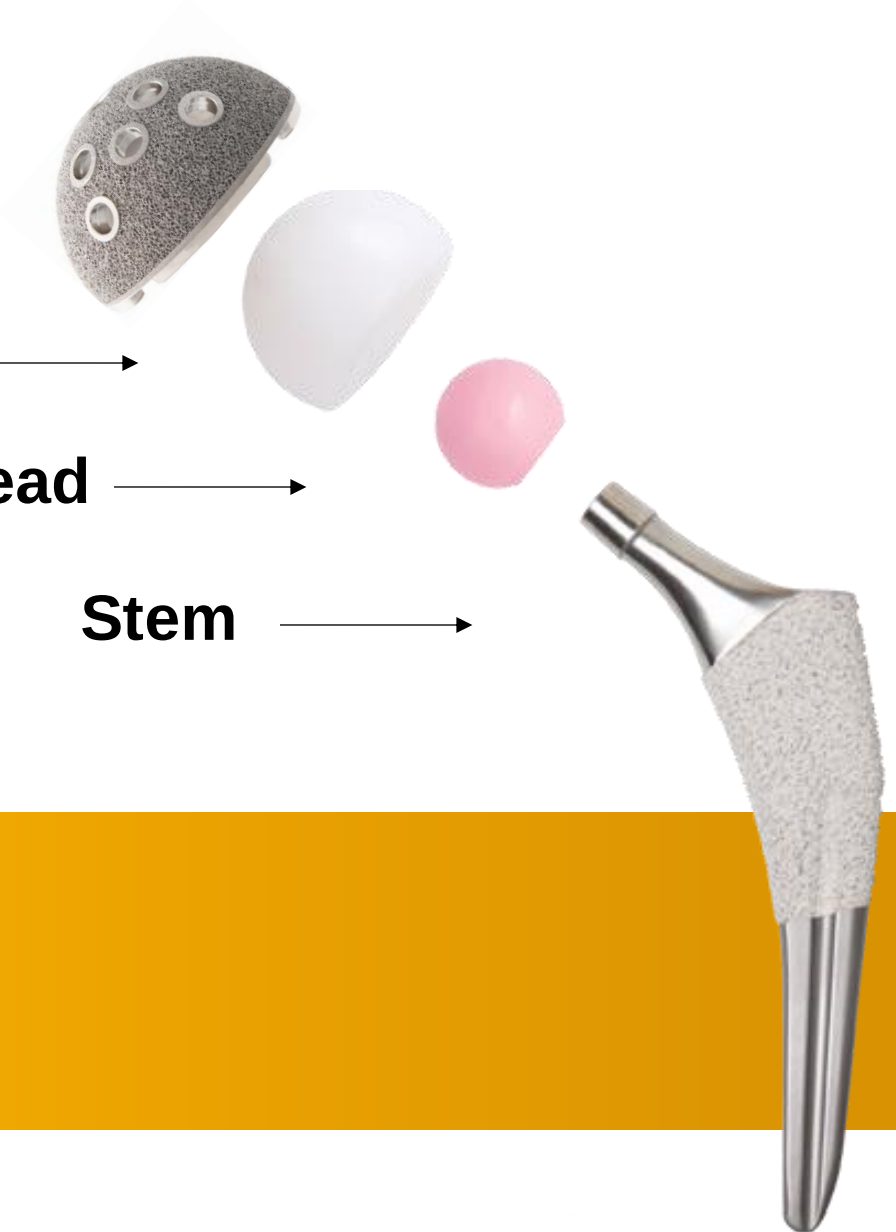
Hip implants

Acetabular cup →

Polyethylene liner →

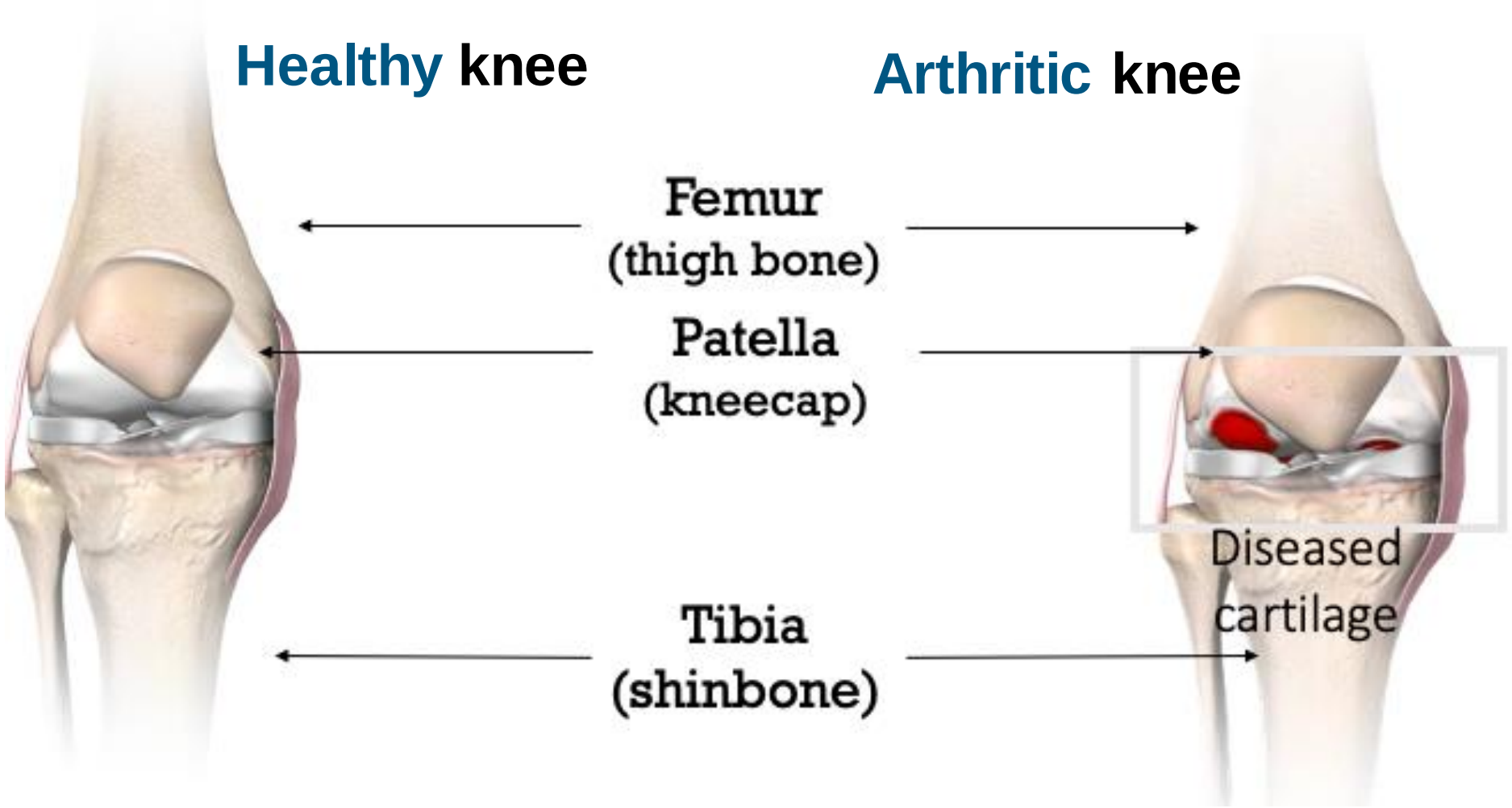
Femoral head →

Stem →

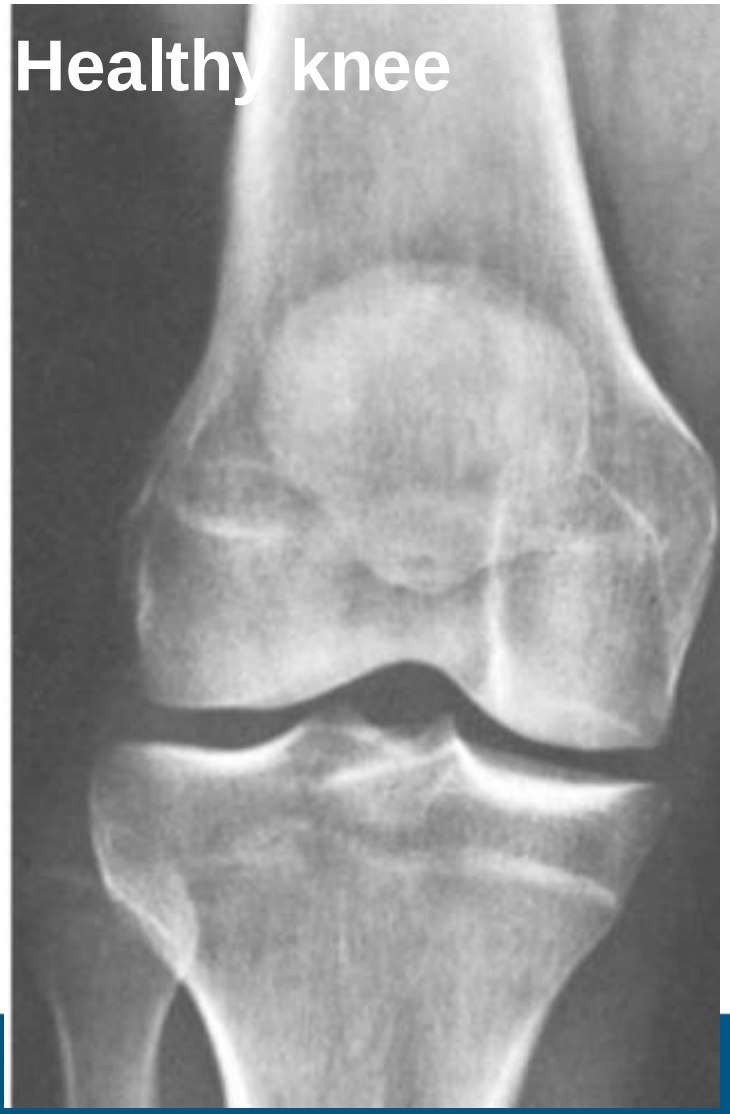


Replaced Hip X-ray

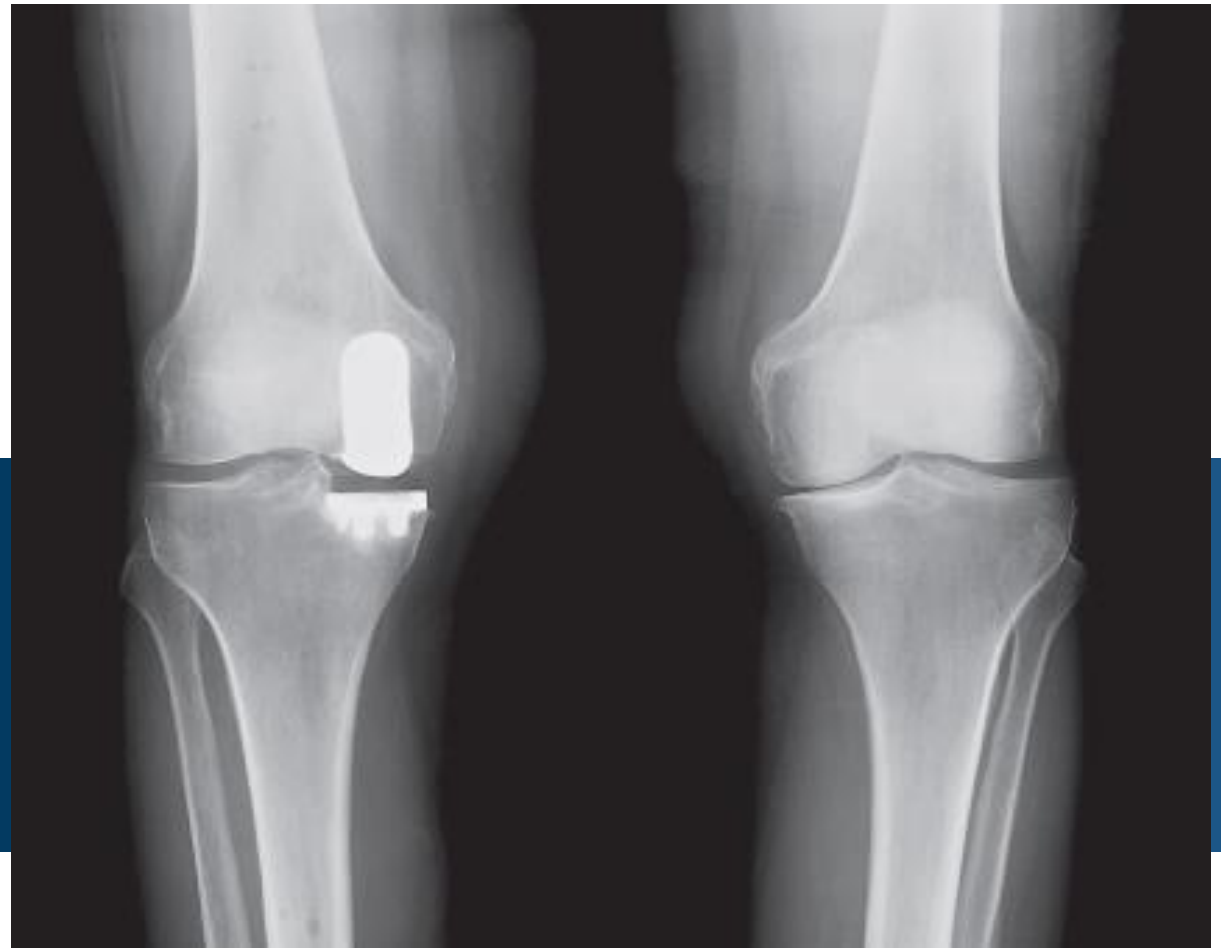
Knee anatomy



Knee anatomy



Replaced Knee X-Rays



Partial knee replacement

Total knee replacement

Conventional Techniques

Estimate implant sizes, alignment, soft tissue tension for knees

Estimate length and implant position based on x-ray and visualization for hips

Overall, good outcomes but up to 10% patients *may have some minor or major complication that leads to dissatisfaction.*

Robotic-Assisted Hip & Knee Surgery: The Present

Is This New Technology?

14+ years
robotic-arm assisted surgery experience

145+
published, peer reviewed studies

850+ Systems
have been installed across 26 countries and every state in the contiguous U.S.*

1,000+
U.S. and foreign patents and patent applications have been established

300K+
Mako procedures have been performed*

*Stryker's 2019 sales data

What Are The Benefits?

Total Knee

- Patients surveyed 6 months after surgery reported lower pain scores than those who received a conventional joint replacement
- Greater soft tissue and ligament protection than manual surgery
- Preservation of healthy bone

Partial Knee

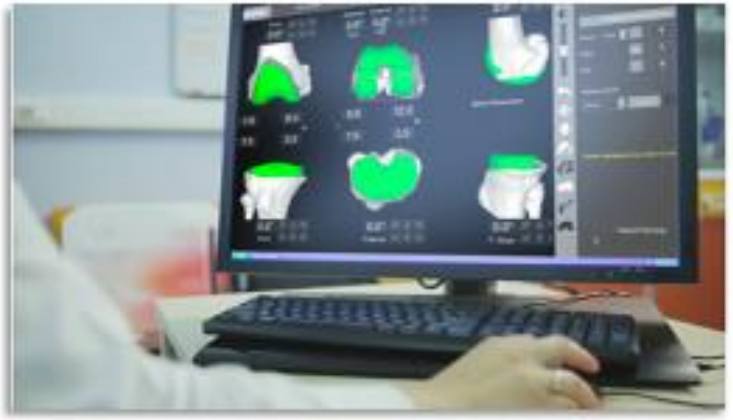
- Less pain in the days and weeks following the surgery
- Shorter hospital stay
- Quicker recovery in a study where 90% of patients were walking without an aid three weeks after surgery.
- Preservation of healthy bone

Total Hip

- Replication of the feeling of a natural hip
- Preservation of healthy bone
- More accurate placement and alignment of hip implants based on the surgical plan
- Less risk for dislocations and leg length discrepancy

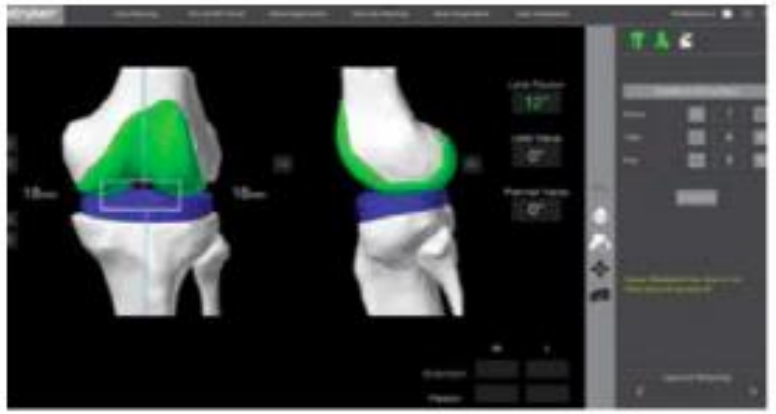
How does it work?

1. Personalized surgical plan

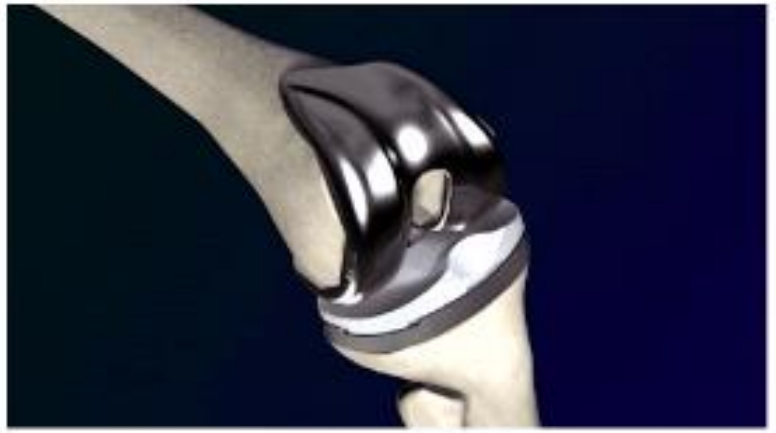


2. Arthritic bone removal

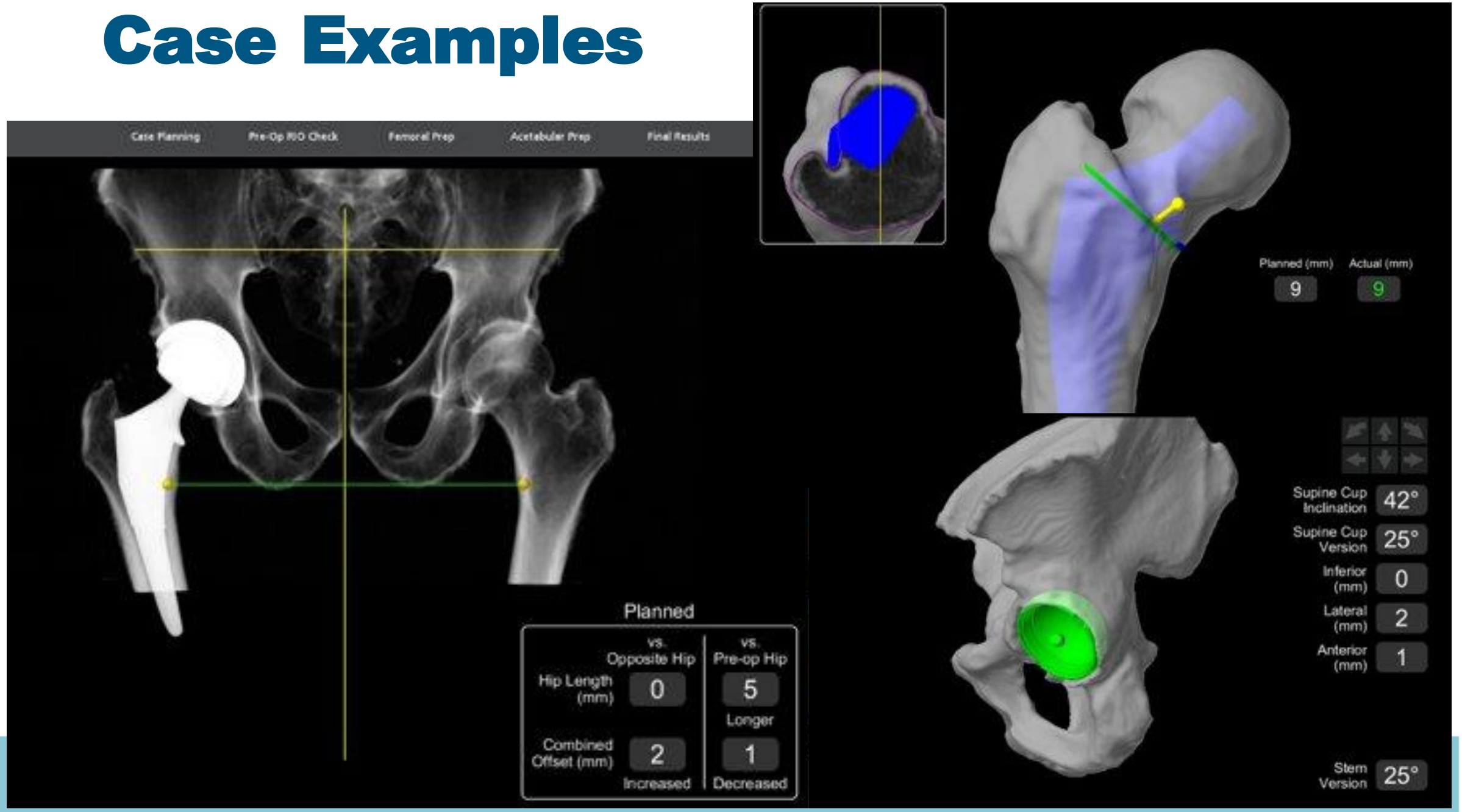
3. Range-of-motion assessment



4. Implant placement



Case Examples



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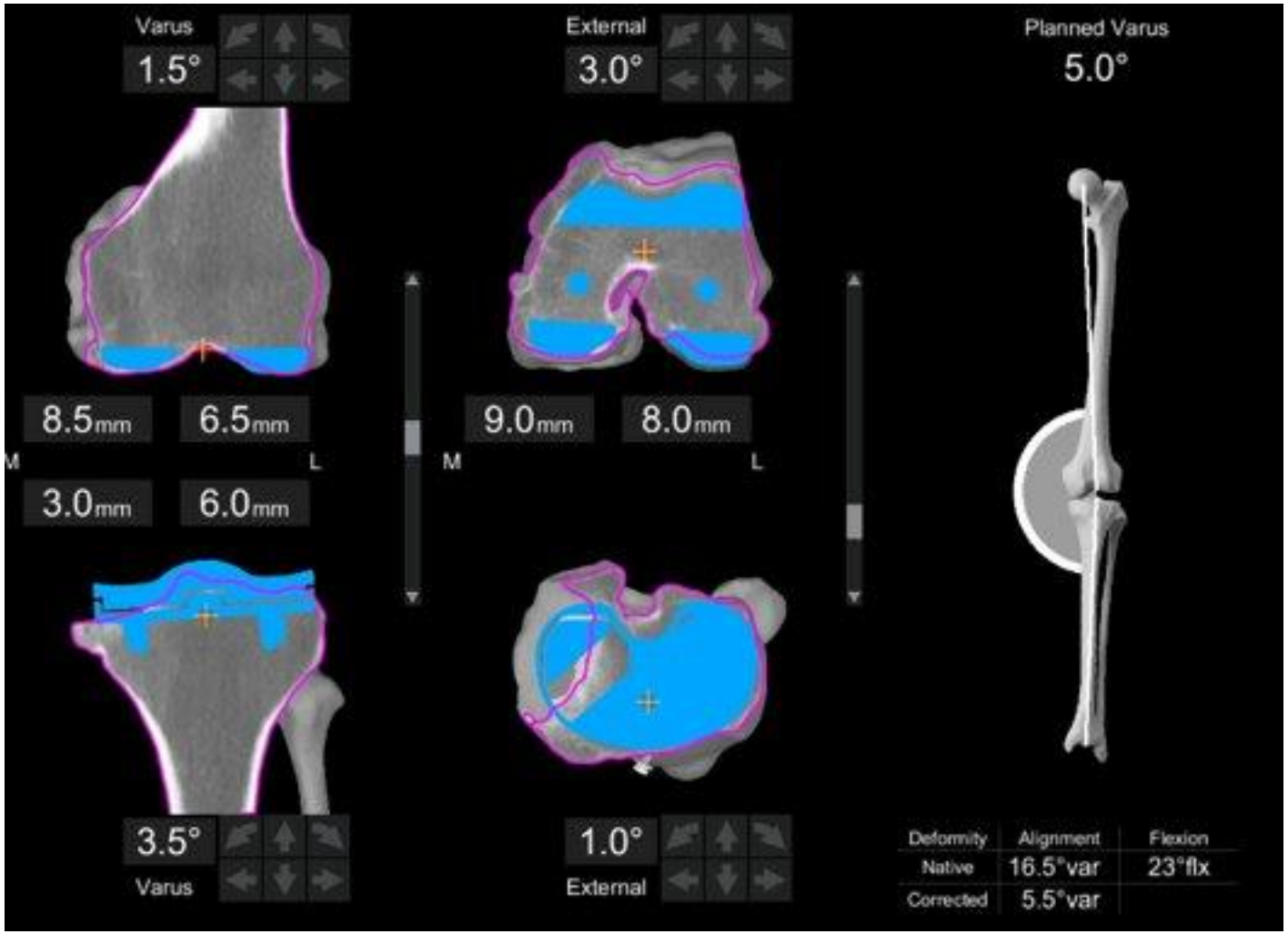

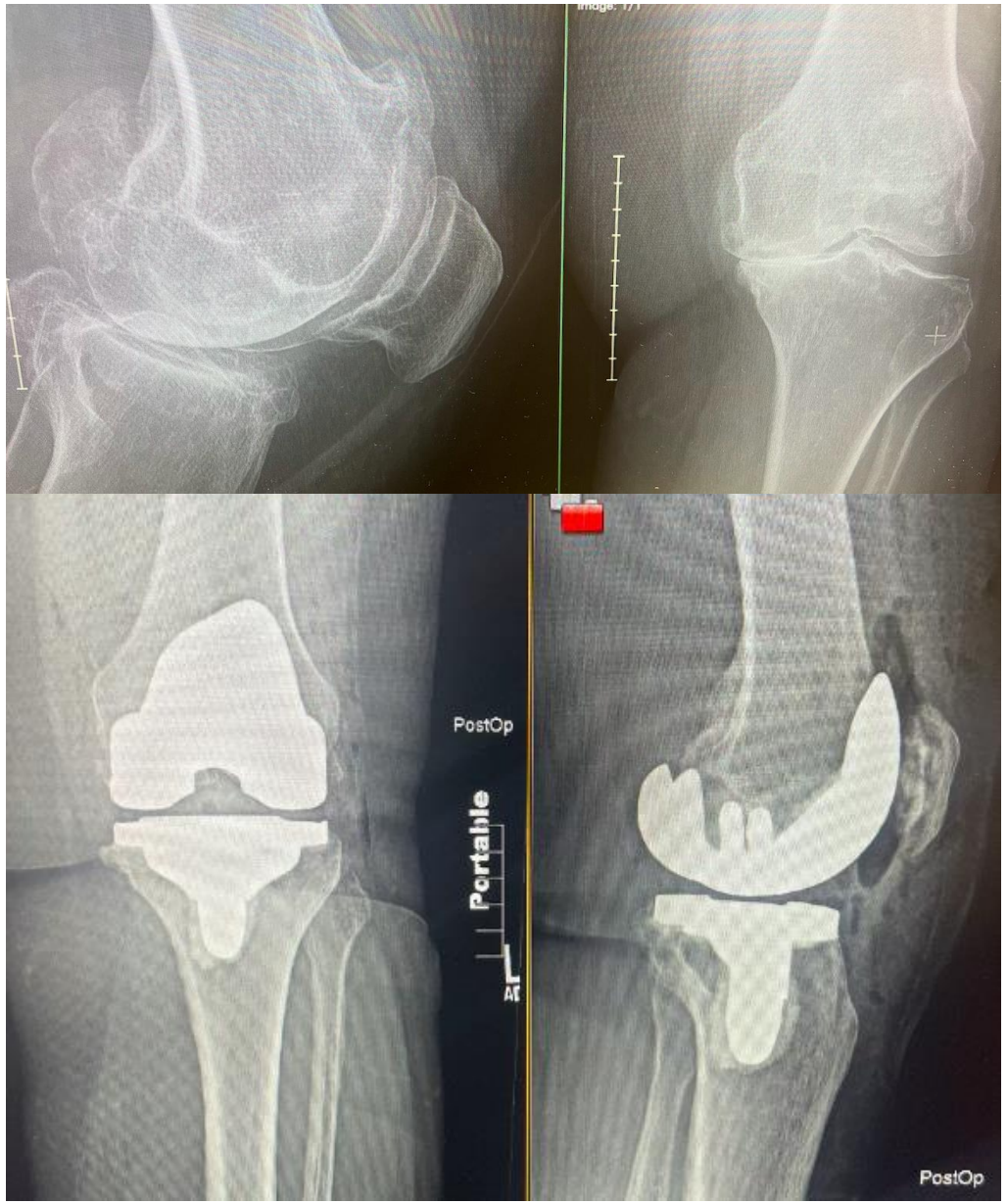

Q&A

- Non-surgical management options
- Surgical treatment options
- Who is a surgical candidate
- Robotics in joint replacement
- Recovery after surgery
- Implant longevity
- Postsurgical restrictions