

enovis™

KNEE REPLACEMENT

with ARVIS® AUGMENTED REALITY

Understanding anatomy, pain,
treatment, and replacement surgery



Most people don't think about the movement of their joints until their joints become diseased and painful.

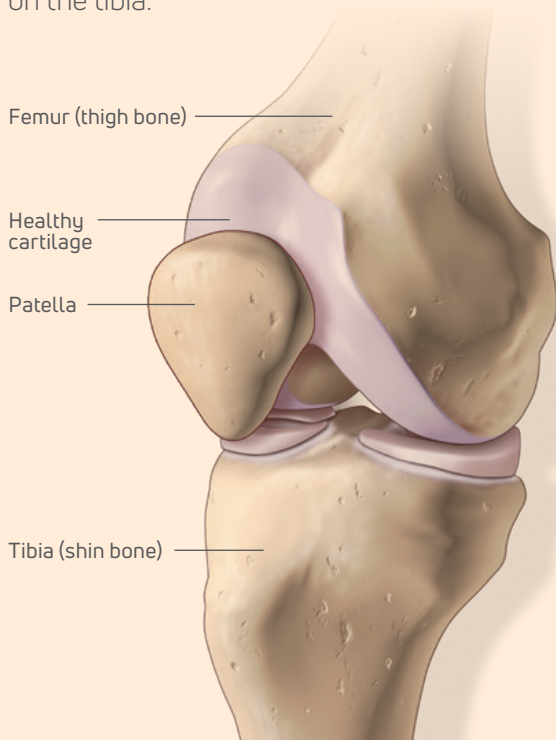
Normally, your knee joint moves easily. But when you have arthritis, the pain can severely limit your ability to move and enjoy life.

This brochure will help you understand knee anatomy, treatment options for your knee pain and explain total knee replacement surgery. Understanding your options will help you choose the best course of treatment to relieve your pain.



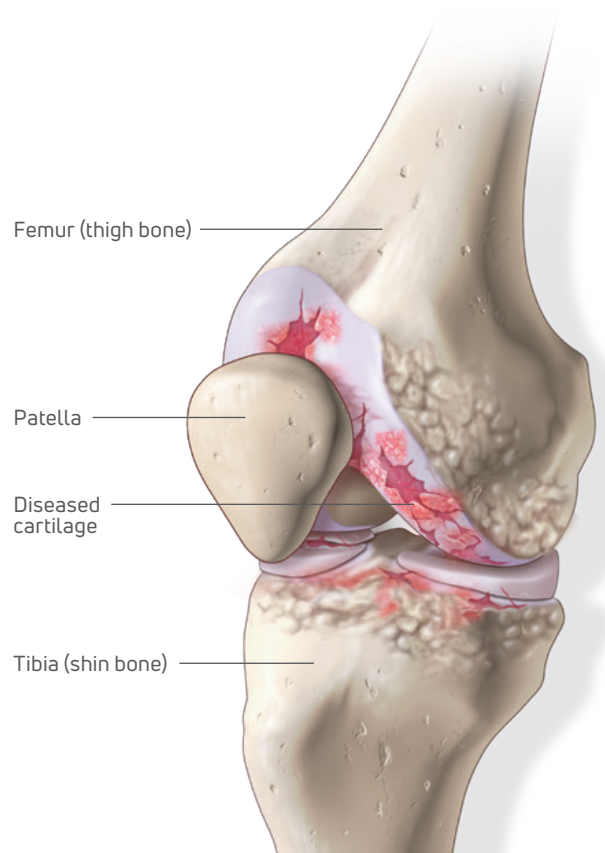
HOW THE KNEE WORKS

The knee is the body's largest weight-bearing joint. Three bones meet to form your knee joint - your thighbone (femur), shinbone (tibia), and kneecap (patella). Cartilage is a layer of tissue that covers the end of the thighbone and the top of the tibia. Healthy cartilage absorbs stress and allows the femur to glide on the tibia.



CAUSES OF KNEE PAIN

Arthritis is a condition that affects the cartilage of the joints and is the primary cause of knee pain. As the cartilage lining wears away, the protective lining between the bones is lost. When this happens, painful bone-on-bone arthritis develops. Severe knee arthritis is quite painful and can restrict motion in your knee. While this may be tolerated with some medications and lifestyle adjustments, there may come a time when surgical treatment is necessary.

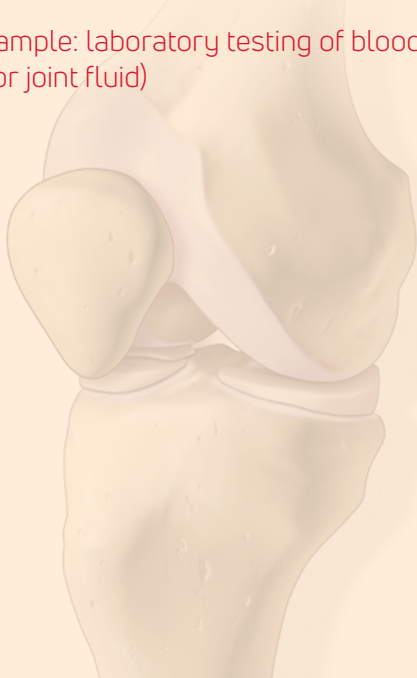


ORTHOPAEDIC EVALUATION

To properly diagnose your condition, your orthopaedic surgeon will conduct a thorough evaluation, which may consist of:

- Review of your medical history
- Physical examination
- X-rays
- Additional tests as needed

(for example: laboratory testing of blood, urine, or joint fluid)



TREATMENT OPTIONS

Depending on your diagnosis and the severity of your knee arthritis, your treatment options may include:

- Medications
- Joint fluid supplements
- Physical therapy
- Joint replacement

KNEE REPLACEMENT SURGERY

It's time to consider knee replacement surgery when arthritis limits your everyday activities such as walking and bending, and when you get little pain relief from anti-inflammatory drugs or other treatments, such as physical therapy.

The goals of knee replacement surgery are to promote pain relief and help restore the range of motion in the knee. Knee replacement involves the removal of arthritic bone ends and damaged cartilage and replacing them with prosthetic implants that are designed to replicate the knee joint.

Not all knee prostheses are the same, and ultimately your surgeon will be able to determine the optimal design to maximize performance and longevity.

One of the critical factors that helps determine how long your implant will last is accurate implant placement and alignment of the knee implant components.

AUGMENTED REALITY (AR) IN ORTHOPAEDICS

Computer assisted surgery for hip and knee replacement has been a significant advancement in orthopedics by providing detailed information to the surgeon during surgery. The technology has been around for several years now, but augmented reality (AR) takes the technology to the next level and is designed to improve patient outcomes.



ARVIS® (Augmented Reality Visualization and Information System) is a revolutionary new platform for orthopedic surgery guidance. ARVIS uses augmented reality technology to provide the surgeon real-time information to meet their goals of precise and accurate implant placement.

BENEFITS OF ARVIS®

There are several important potential benefits to ARVIS:

- Designed to enhance surgeon's ability to precisely position the implants, potentially extending the life of the implant.
- A pre-operative CT scan or MRI may not be necessary, based on your surgeon's plan. If no scan or MRI is required, eliminates the unnecessary exposure to radiation.
- Allows your surgeon to tailor your surgery based on your unique anatomy.
- Utilized with specialized instruments to facilitate optimal use of the system.

It is important to understand that your surgeon is always in control of the system and your procedure. A common misconception with computer-assisted or robotic technology is that a robot is doing the surgery, but that is not the case. Your surgeon is utilizing information from ARVIS and is ultimately the one making the decisions and performing the surgery.

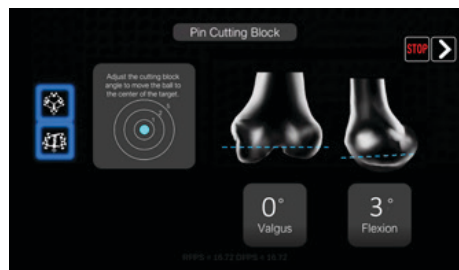
TOTAL KNEE REPLACEMENT PROCEDURE WITH ARVIS®

The surgical procedure itself is the same as a total knee replacement without ARVIS®; with the difference being the computer-generated information superimposed in the surgeon's field of view on your knee.

Before your surgery begins, ARVIS will be attached to your surgeon's surgical helmet or headband.



Once your surgeon gains exposure to the joint, he/she will attach trackers to your knee. ARVIS uses infrared cameras to locate the trackers thereby letting the computer know where your knee is in space. Your surgeon will see an overlay of real-time navigation information on the operating room table allowing him or her to set the instrument guides in the optimal position for your unique knee.



The end of the femur (thigh bone) is cut into a shape that matches the inside surface of the metal femoral component. The femoral component is then placed on the end of the femur. The tibia (shin bone) is cut flat on the top and the bone is sized to fit the metal tibial component. Then, the metal tibial component is inserted into the bone and a plastic insert is snapped into the tibial component.

The femoral component will slide on the plastic tibial component as you bend your knee. In most cases, the patella (kneecap) is also replaced with a plastic component. Your surgeon will conduct several tests during the surgery to help ensure you regain good balance and motion in your knee.

The trackers are only needed during the procedure; they are removed at the end of the surgery.

EMPOWR™ KNEE PROSTHESIS

The EMPOWR Knee System® leverages over 20 years of clinical success. Like many modern knee systems, the EMPOWR™ knee offers multiple constraint options to enable your surgeon to tailor the implant to meet your specific needs.

The EMPOWR 3D Knee® is the only total knee implant designed specifically to recreate the Dual-Pivot™ motion pattern of a healthy knee.¹ In one clinical study, EMPOWR 3D Knee patients had statistically significant less pain when walking compared to traditional non-conforming knees. These patients also participated in very active activities such as impact sports more regularly.²

Femur (thigh bone)

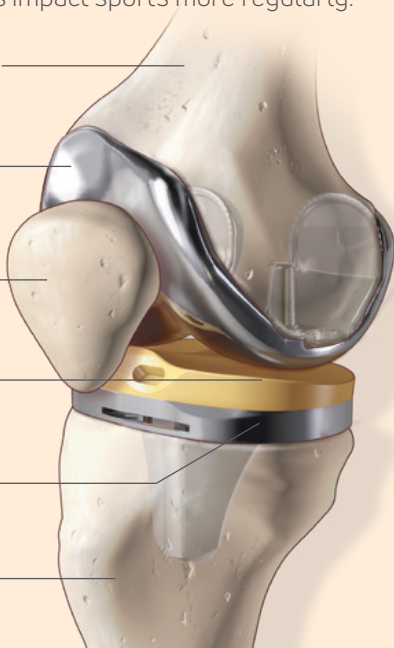
Femoral component

Patella

Tibial insert

Tibial component

Tibia (shin bone)



IMPLANT LONGEVITY

Vitamin E is a naturally-occurring antioxidant that has been added to some plastic (polyethylene) implants. Blended Vitamin E polyethylene helps provide smooth movement throughout range of motion, maintains the strength of the plastic implant and is shown to reduce long-term wear by up to 92%, which may extend the life of your implant.³

RECOVERY

Exercise is an important part of the recovery process. Your doctor or physical therapist will provide you with specific exercises to help restore movement and strengthen your knee joint. In general, your doctor will encourage you to use your “new” joint shortly after your operation, sometimes even the same day. You will work with a physical therapist to resume daily activities and strengthen your muscles.

SUMMARY

Not all knee prostheses are the same, and ultimately your surgeon will be able to determine the optimal design to maximize performance and longevity. Component position is critical to a long-lasting knee replacement and Augmented Reality technology, like ARVIS®, assists surgeons with proper implant alignment.

If conservative treatments have not been effective for your knee arthritis, talk to your doctor about total knee replacement using ARVIS.



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1. Banks, Scott A., and Robert M. Meneghini. "Achieving More Natural Motion, Stability, and Function With a Dual-Pivot ACL-substituting Total Knee Arthroplasty Design." *Techniques in Orthopaedics* 33, no. 1 (2018): 48-51.2.
2. Sandberg, Rory, et al. "Dual-pivot bearings improve ambulation and promote increased activity levels in Total knee arthroplasty: A match-controlled retrospective study." *The Knee* 26.6 (2019): 1243-1249.
3. Data on file with DJO Surgical®

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