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Minimally Invasive Total Knee Replacement

Total knee replacement (also called knee arthroplasty) is a common orthopaedic procedure that is used to replace the damaged or worn surfaces of the knee. Replacing these surfaces with an implant or "prosthesis" will relieve pain and increase mobility, allowing you to return to your normal, everyday activities.

The traditional approach to knee replacement uses a long vertical incision in the center of the knee to view and access the joint. Minimally invasive total knee replacement is a variation of this approach. The surgeon uses a shorter incision and a different, less-invasive technique to expose the joint—with the goal of reducing postoperative pain and speeding recovery.

Unlike traditional total knee replacement, the minimally invasive technique is not suitable for all patients. Your orthopaedic surgeon will discuss the different surgical options with you.

Description

During any knee replacement, the damaged cartilage and bone from the surface of the knee is removed, along with some soft tissues. The goal of knee replacement surgery is to provide the patient with a pain-free knee that allows for the return to daily activities and lasts for a long time.

Minimally invasive knee replacement differs from traditional knee replacement in that it uses an incision that is approximately half as long and fewer muscles are cut and detached.

Traditional Knee Replacement

To perform a traditional knee replacement, the surgeon makes an 8- to 10-inch vertical incision over the front of the knee to expose the joint. The surgeon will then:

- **Prepare the bone.** The damaged cartilage surfaces at the ends of the femur and tibia are removed along with a small amount of underlying bone.
- **Position the metal implants.** The removed cartilage and bone is replaced with metal components that recreate the surface of the joint.
- **Resurface the patella.** The undersurface of the patella (kneecap) is cut and resurfaced with a plastic button. Some surgeons do not resurface the patella, depending on the case.
- **Insert a spacer.** A plastic spacer is inserted between the metal components to create a smooth gliding surface.

Minimally Invasive Knee Replacement

In minimally invasive knee replacement, the surgical procedure is similar, but there is less cutting of the tissue surrounding the knee. The artificial implants used are the same as those used for traditional knee replacement. However, specially designed surgical instruments are used to prepare the femur and tibia and to place the implants properly.

Minimally invasive knee replacement is performed through a shorter incision—4 to 6 inches versus 8 to 10 inches for traditional knee replacement. A smaller incision allows for less tissue disturbance.

In addition to a shorter incision, the technique used to open the knee is less invasive. In general, techniques used in minimally invasive knee replacement are "quadriceps sparing," meaning they avoid trauma to the quadriceps tendon and muscles in the front of the thigh. Other minimally invasive techniques called "midvastus" and "subvastus" make small incisions in the muscle but are also less invasive than traditional knee replacement. Because the techniques used to expose the joint involve less disruption to the muscle, it may lead to less postoperative pain and reduced recovery time.

The hospital stay after minimally invasive surgery is similar in length to the stay after traditional knee replacement surgery—ranging from 1 to 4 days. Physical rehabilitation is a critical component of recovery. Your surgeon or a physical therapist will provide you with specific exercises to help increase your range of motion and restore your strength.

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Candidates for Minimally Invasive Total Knee

Replacement

Minimally invasive total knee replacement is not suitable for all patients. Your doctor will conduct a thorough evaluation and consider several factors before determining if the procedure is an option for you.

In general, candidates for minimal incision procedures are thinner, younger, healthier and more motivated to participate in the rehabilitation process, compared with patients who undergo the traditional surgery.

Minimally invasive surgeries may be less suitable for patients who are overweight or who have already undergone other knee surgeries.

In addition, patients who have a significant deformity of the knee, those who are very muscular, and those with health problems that may slow wound healing may be at a higher risk for problems from minimally invasive total knee replacement.

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Conclusion

Minimally invasive knee replacement is an evolving area and more research is needed on the long-term function and durability of the implants.

The benefits of minimally invasive knee replacement have been reported to include less damage to soft tissues, leading to a quicker, less painful recovery and more rapid return to normal activities. Current evidence suggests that the long-term benefits of minimally invasive surgery do not differ from those of knee replacement performed with the traditional approach.

Like all surgery, minimally invasive surgery has a risk of complications. These complications include nerve and artery injuries, wound healing problems, infection, and errors in positioning the prosthetic knee implants.

Like traditional knee replacement surgery, minimally invasive surgery should be performed by a well-trained, highly experienced orthopaedic surgeon. Your orthopaedic surgeon can talk to you about his or her experience with minimally invasive knee replacement surgery, and the possible risks and benefits of the techniques for your individual treatment.

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