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Computer Assisted Knee Surgery

Fact Sheet

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What is a Total Knee Replacement Surgery?

A total knee replacement surgery is a surgical procedure that replaces the diseased or damaged cartilage and bone of the knee with a new knee implant made of artificial materials.

What is Computer Assisted Knee Surgery for Total Knee Replacement Surgery?

- Technology that helps the surgeon more accurately align knee implants with the patient's anatomy.
- It provides the surgeon with real time information needed to allow for accurate alignment of the implant, which is one of the most important prerequisites for the knee joint's stability, durability of the implant and for a sufficient range of motion.
- This technology consists of an infrared camera, specialized navigation computer software and various smart instruments (embedded with light emitting diodes (LEDs)).

How does Computer Assisted Knee Surgery Work?

- In the operating room, the position of navigated smart instruments equipped with infrared LEDs is continually monitored by an infrared camera and analyzed by the navigation software. The general premise behind computer assisted knee surgery is that the navigation software creates a virtual computer model of the patient's knee. Through a process called registration, in the operating room, the surgeon touches off on certain anatomical landmarks on the patients knee. The software uses this data to create the virtual computer model.
- Once registration is complete, the software analyzes and graphically displays the alignment and position of navigated smart instruments as well as the kinematics of the knee in real time.
- Smart instruments send real time data regarding knee kinematics to the computer.
- The computer analyzes and displays data the surgeon needs to make more exact boney cuts and accurately align the implant to the patient's unique anatomy.

What are the Potential Benefits of Computer Assisted Knee Surgery?

- It does not require pre-operative x-rays or CT scans.
- In the operating room, it provides the surgeon with a comprehensive understanding of the patient's unique anatomy before any bone cuts are made.
- It allows the surgeon to make adjustments within 1-2 degrees, helping ensure the best possible fit of the implant.
- It may lead to possible shorter hospital stays, fewer complications, and improved joint stability[2].

Who has the Potential to Benefit from Computer Assisted Knee Surgery?

- More replacements, or arthoplasties, are performed on the knee than any other joint[1].
- There are approximately 600,000 total knee arthoplasties (TKA) performed each year in the U.S.[1]
- TKA is usually recommended for patients with severe knee pain and disability caused by damage to cartilage from rheumatoid arthritis, osteoarthritis or trauma.

1 American Academy of Orthopaedic Surgeons - www.aaos.org

* Patients should consult their physicians regarding risks associated with Total Knee Replacement Surgery.

2 J.M. Sikorski, S. Chauhan (2003).Aspects of Current Management, Computer Assisted Orthopedic Surgery: Do We Need CAOS? JBJS(Br) Vol. 85-B, No. 3.