

Patient Specific MRI Guides for Total Knee Replacement



Knee guides are **patient-specific** surgical instruments. Each guide is designed for a **specific patient** and used to assist in implant placement during the surgery. The product helps to **simplify** the surgical procedure by reducing the number of required instruments.

What is a 'guide'?

A guide is an **instrument** that **matches the anatomy** of your knee and incorporates a **personal surgical plan** for its treatment. During surgery, the guide transfers the plan prepared by your surgeon to your knee by **guiding surgical instruments**.



What does 'patient-specific' mean?

Patient-specific refers to the fact that the instruments **match your knee specifically**. Each guide is **uniquely** designed and produced **for a specific patient** and surgery.

Based on an **MRI scan (Magnetic Resonance Imaging)**, your surgeon **plans** your surgery **in three dimensions with a computer program**. Once the surgeon has defined the **preferred surgical approach** and treatment plan for you, a patient-specific guide is designed and manufactured using **3D Printing technology**. During surgery, the surgeon uses the **unique shape** of the guide to **match it** on your knee. Once the guide has been positioned by the surgeon, it **guides the surgeon's instruments** to transfer the surgical plan into surgery.

Product highlights

Visualizing the **patient's anatomy in 3D** prior to surgery, allows the surgeon to **plan in detail**. This approach results in several clinical advantages:

- Achieve **reliable implant positioning and sizing** (Alcelik et al., 2017; Thienpont et al., 2017)
- Eliminate surgical steps to **increase procedure efficiency**
- **Reduced instrument sets and number of trays**
- **Reduced cost of sterilization and operating room time**
- **Knowing what to expect** for each patient
- **Simulate** the surgical procedure **prior to surgery**
- **Less invasive** procedure without intramedullary rod with **potential for less blood loss**

Case Id: GO15-OXA-NAZ
Leg Side: Right

Total Knee Planner

Preferences Help

▼ Pre-op

Please note: Angle depicted is non-weight bearing and may be influenced by leg positioning during scanning.

4° Varus

► Femur

► Tibia

materialise

2D 3D Cuts Implants Landmarks Notes

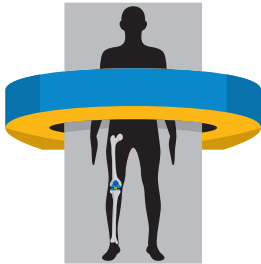
✓ This plan is approved
Neither saving changes nor further approval are possible.

How is my patient-specific guide produced?



Consultation

During a **pre-operative consultation**, your surgeon will **explain the procedure** of total knee arthroplasty to you. An **MRI** scan of your lower limb will be **scheduled**.



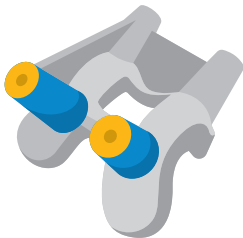
MRI scanning

An **MRI** scan of your **femur** (thighbone) and **tibia** (shinbone) is made by a radiologist. This scan will be processed by **Materialise** to create your **surgical plan and guide**.



Pre-surgical planning

A **clinical engineer** will create a **3D anatomical model** of your knee and prepares the initial **surgical plan**. This **patient-specific model** and **3D plan** allows the surgeon to visualize your knee surgery in three dimensions and to **plan** the different **surgical steps in detail**.



Guide design

Once your **surgeon** has **approved** the surgical plan, a **clinical engineer** creates a set of **patient-specific knee guides**.



Surgery

After a **quality control**, the guides are shipped to the hospital prior to your surgery. The guides are used to **transfer the pre-operative plan during surgery**.

References:

Alcelik, I., Blomfield, M., Öztürk, C., Soni, A., Charity, R., Acornley, A., 2017. A comparison of short term radiological alignment outcomes of the patient specific and standard instrumentation for primary total knee arthroplasty: A systematic review and meta-analysis. Acta Orthop. Traumatol. Turc. doi:10.1016/j.aott.2017.02.001
Thienpont, E., Schwab, P.-E., Fennema, P., 2017. Efficacy of Patient-Specific Instruments in Total Knee Arthroplasty: A Systematic Review and Meta-Analysis. J. Bone Jt. Surg. 99, 521–530. doi:10.2106/JBJS.16.00496