SYNOPSYS®

360 Knee Systems
Patient-Specific Total Knee Replacements

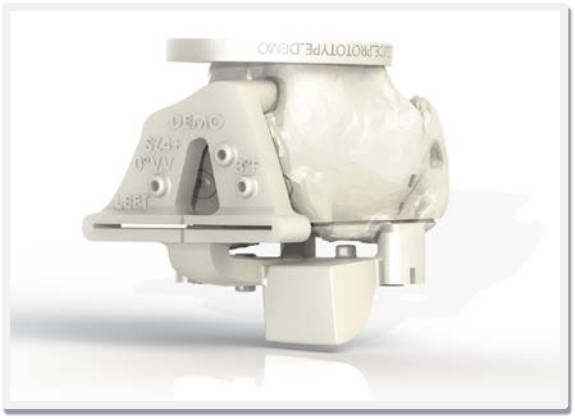
Pre-operative plans and 3D printed guides to optimize surgical procedures

We use Simpleware as our image processing software. The software is able to create extremely detailed and accurate 3D models of the knee from CT scans, which are used as inputs to our simulation and design of the patient-specific guides."

Willy Theodore
Systems Engineering Manager, 360 Knee Systems

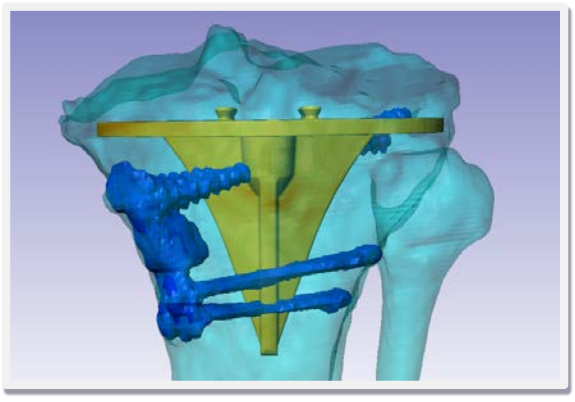
Overview

360 Knee Systems is a company that specializes in innovative technology for total knee replacement surgery. 360 works with orthopedic surgeons, providing dynamic, functional, and patient-specific planning and simulation solutions. In order to make patient-specific preoperative plans, it is important to get accurate representations of the patient bone geometry, a challenge solved by using Simpleware software.



Highlights

- CT scans of patient bones received
- 3D models of patient bones are generated in Simpleware for analysis and simulation
- Technology provides patient-specific analysis to surgeons to optimize surgical planning and procedures
- Patient-specific guides designed based on simulation outputs

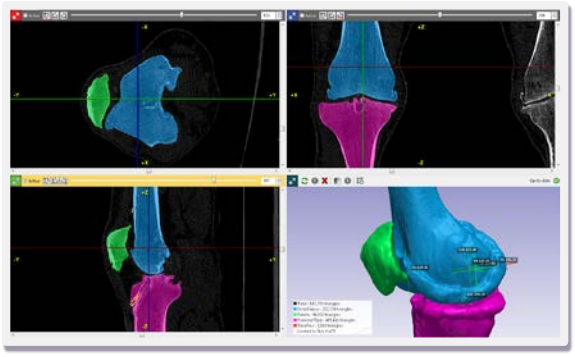


We use computational software to create patient-specific surgical plans and patient-specific guides that are used to optimize the procedure of completing a total knee replacement."

Willy Theodore
Systems Engineering Manager, 360 Knee Systems

Generating 3D models

CT scans of the hip, legs and ankle bones of patients are obtained by 360 Knee Systems, and imported to Simpleware ScanIP to generate 3D models of the anatomy to a high level of quality and detail. 360 Knee Systems also use Simpleware CAD to carry out basic CAD manipulation for positioning implants within the patient geometries. The accuracy of the models ensures that realistic simulations can be carried out.

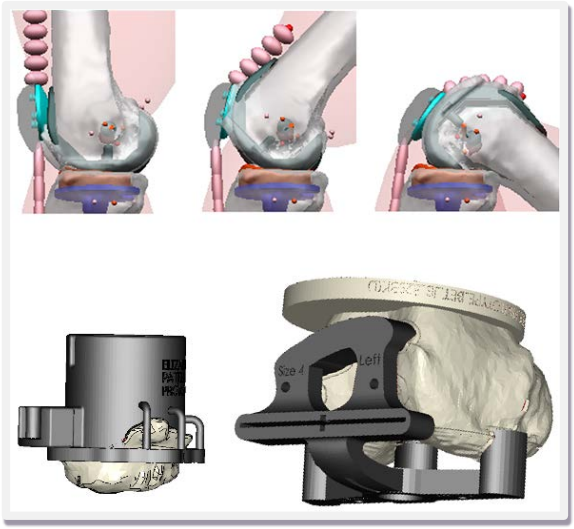


Landmarking

360 Knee Systems worked with Simpleware's services team to write scripts to more easily perform repeatable operations such as optimizing the segmentation process and landmarking the scanned bones. Precise land-marking is crucial to the analysis of the geometry, as the results are used to create axes and references within the simulation. The scripts reduce the amount of manual work required for this task.

Creating plans and guides

The 3D models generated in Simpleware ScanIP are used to create patient-specific guides for surgeons. Each guide is tailored to the specific bone geometry of a patient, and is designed to help make appropriate cuts for surgery. 360 Knee Systems use these models to provide preoperative plans of the optimal placement of knee implants and the patient's bone geometry that surgeons can familiarize themselves with prior to surgery. 3D printed guides are also created that provide accurate cutting positions for the patella, femur, and tibia components of the implant and are specific for each patient.



"Overall our technology is used to help optimize surgeries. It is beneficial for surgeons to be aware of the condition of the knee and overview of implants position and size for a particular patient pre-operatively.

Willy Theodore
Systems Engineering Manager, 360 Knee Systems

SYNOPSYS®
Predictable Success

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