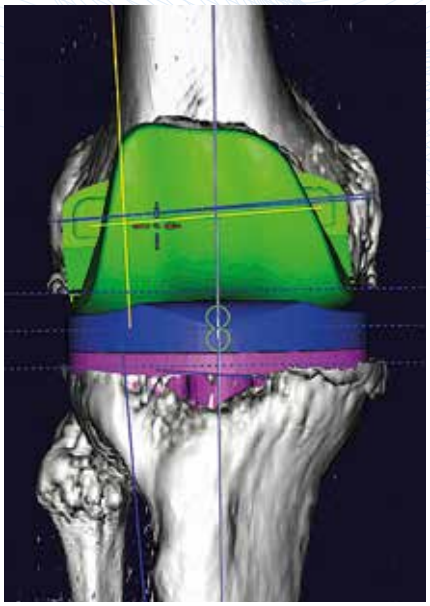
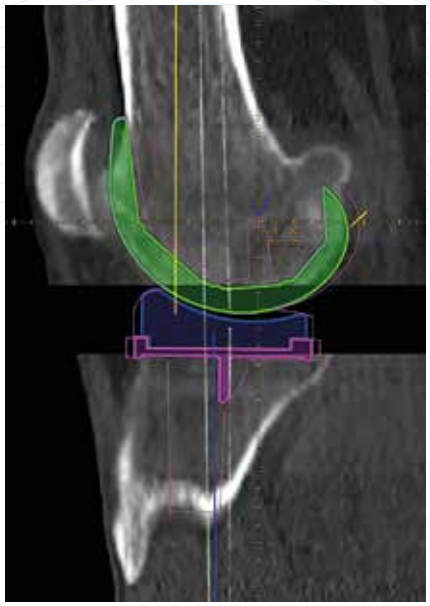
3D Knee

Patellofemoral Measurements
Corrective Osteotomies
Prosthesis Planning
Hybrid planning
3D Printing





mediCAD®

Software
Bundesverband IT-Mittelstand
Made in Germany
100% Service Quality Future

www.mediCAD.eu

Greetings,

As quality consciousness continues to rise and well informed patients demand more and more from clinics and medical practices, we are committed to helping you meet these demands by offering the highest quality, most advanced products in professional, digital preparation for surgery. Digital images are the future, and competent surgical planning is the basis for successful, efficient endoprosthetic care.

Our **3D Knee** software module is a solution that allows you to carry out a variety of knee treatment procedures. These include measurements for examining the knee joint, joint-preserving procedures such as corrective osteotomies and preoperative planning for joint replacements using high-resolution, three-dimensional images (CT, MRI and CBCT).
This enables you to measure and plan the different stages of joint degeneration as well as a wide variety of deformities ahead of joint replacement. **mediCAD® 3D Knee** reduces surgery times as decisions previously made during surgery can now be dealt with preoperatively in advance. What's more, rehabilitation can be accelerated with the aid of precise geometric restoration of the knee joint. The third plane shown in 3D planning helps to reduce complications by enabling you to solve challenges preoperatively during planning to prevent them arising during surgery.

Scientific tasks should be simpler, faster, systematically supported and substantiated by up-to-date images that do not take a lot of time to prepare. Everyday consultation in your clinic should be more accessible, transparent and should offer easy-to-understand quality improvements and assurances.

With **mediCAD® 3D Knee**, scientific work can be supported and documented more easily, more quickly and without a large investment of time. More clarity and transparency can be achieved in your daily meeting and coordination routine at your hospital, resulting in more traceable quality and quality assurance. You will find in our user-reviews that the doctors we work with are extremely impressed by our intuitive product concept, which is very simple to use.

They also greatly appreciate the opportunity to take advantage of our implant database, which is updated monthly, and our modern, digital product catalog for implant care. We know that you will be too! You can arrange a free, non-binding demonstration of our system. We look forward to hearing from you soon!

With kind regards,
mediCAD Hectec GmbH

mediCAD® is a combined package of modules, intended for use by trained medical specialists. It allows these specialists to assess bone and joint deformities, and plan implants for joint replacement and osteotomies based on 2D and 3D X-ray images.

The system was developed in collaboration with doctors for doctors, which means for you and your patients:

- World's first and most used planning program on the market
- Free interface to PACS via the **mediCAD®** Query Client
- Over 20,000 clinical users worldwide
- All known planning methods are taken into account
- A modular design with powerful add-on modules
- Easy and intuitive operation
- 23 languages (not available in 3D)
- All processes are documented in compliance with the law
- Time savings of up to 90% over conventional planning
- Access to more than 130 international implant manufacturers with more than 500.000 templates
- **mediCAD®** is continuously being developed with doctors for doctors
- Customized and special functions and modules are constantly being developed and made available
- **mediCAD®** has been successfully used in the medical industry for more than 20 years
- In international markets, **mediCAD®** is also sold under the name IMPAX Orthopaedic Tools (through AGFA Healthcare)
- **mediCAD®** is certified in accordance to 93/42/EWG und EN ISO 13485 and approved as a medical product
- MDSAP certified 512917MDSAP16 (AUS, BRA, CND, USA)
- 510(k) approval for **mediCAD®** was granted by the FDA (K170702)
- **mediCAD®** is licensed for use as a medical device in the Russian Federation. Certificate, 2017/6580 dated 12/15/2017. Unique registry entry number 24304
- is licensed in Japan (JMDN CODE 70030012)
- Guaranteed compliance with the MDR from 2021

Features / Table of content

mediCAD® 3D Knee offers you entirely new possibilities in terms of carrying out the anatomical assessment, planning and measurement of the knee, thereby implementing optimal, audit-compliant operation preparation.
The new modern and intuitive user interface takes you directly where you want to go and is conveniently paired with the existing connection to the PAC system in your clinic!

These are just two of the many reasons that make **mediCAD® 3D Knee** an indispensable tool for your day-to-day work.

mediCAD® 3D Knee was developed in close collaboration with
with specialists in the field of knee surgery. Constant development and improvement is the core mission of our company.

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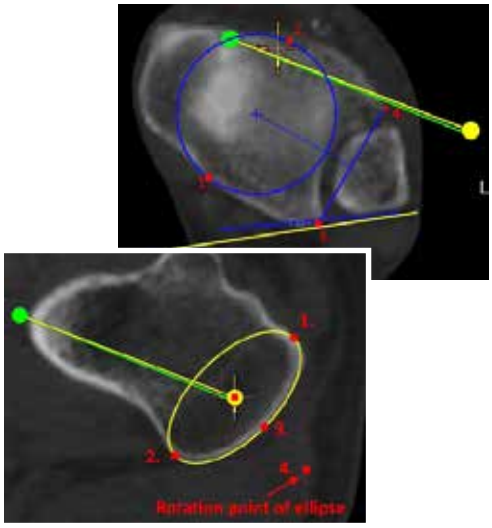
Assessment and joint-preserving procedures

Procedures for preserving the natural knee joint are currently a key component of knee orthopedics. The patellofemoral measurements and the deformity correction functions in **mediCAD® 3D Knee** allow you to assess the joint and, if necessary, to plan an osteotomy to correct the axis. **mediCAD® 3D Knee** lets you record clear, precise dimensions and plans for joint-preserving treatment.

Patellofemoral measurements

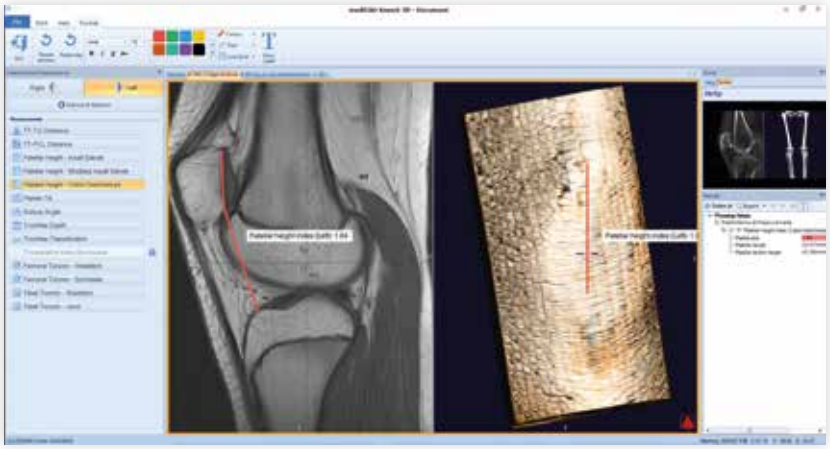


So that the knee joint can be examined fully, the patellofemoral measurements function focuses on treating the patellofemoral joint. All the relevant image data can be loaded at once and the necessary measurements can be taken quickly and easily to examine anterior knee pain and patellar instability. The function supports all imaging types used in daily practice, namely CT, MRI, CBCT and X-ray.

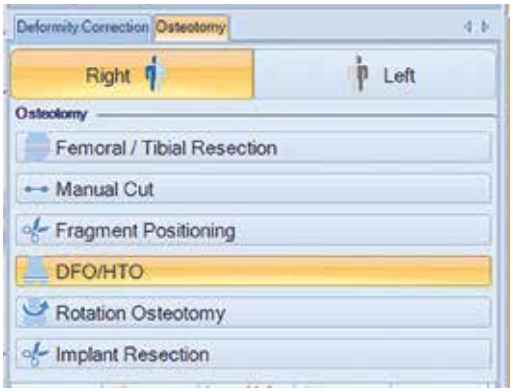
In addition to torsion measurement in accordance with the different methods set out by Waidelich, Schneider and Jend, various indices are available for measuring the patella height.
It is also possible to take measurements to determine the tuberosity misalignment (TT-TG and TT-PCL) and to assess the trochlea. For documentation purposes, the angle of a trochlear dysplasia can be classified according to Dejour.

The following measurements are available:

- Measurement of TT-PCL and TT-TG distance
- Measurement of the patella height index according to Insall-Salvati and Caton-Deschamps
- Patella angle
- Sulcus angle
- Trochlear depth
- Femoral torsion according to Waidelich and Schneider
- Tibial torsion according to Waidelich and Jend
- Trochlear classification according to Dejour
- Measurement of leg axis



Deformity correction / Corrective osteotomy

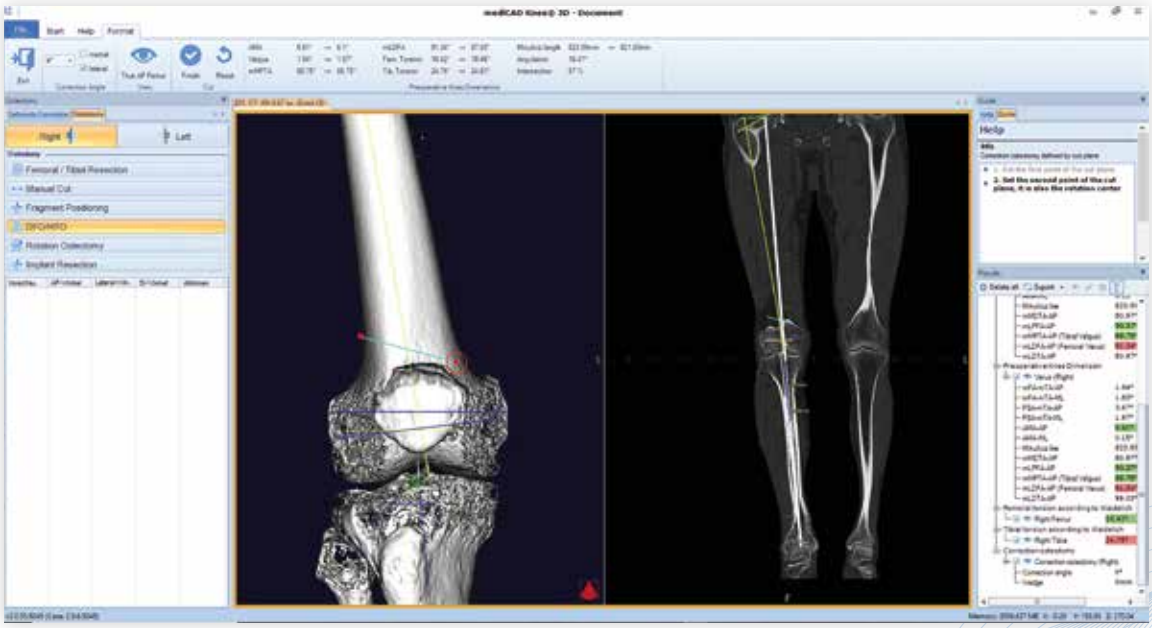


Deformity corrections such as corrective osteotomies are becoming increasingly significant as joint-preserving procedures. One of the issues they address is problems in the patellofemoral joint. In the case of patellar tracking due to a malrotation of the distal femur, maltracking can be corrected with a Derotational osteotomy.

mediCAD® 3D Knee allows you to plan corrections to the frontal alignment, tibia (HTO) and femur (DFO) as well as double-level corrections. You can also plan a torsion correction (including as a single cut) and combine it with a correction of the frontal alignment. You can see a preview of the resulting values for all osteotomies in order to plan the correction and postoperative outcome as effectively as possible in advance. Frontal axis corrections can be planned in both 2D and 3D.

Measurement and planning options:

- Measurement of the leg axes including femoral and tibial torsion
- Measurement of the posterior tibial slope
- Planning a HTO or a DFO
- Planning a double-level osteotomy
- Planning a Derotational osteotomy

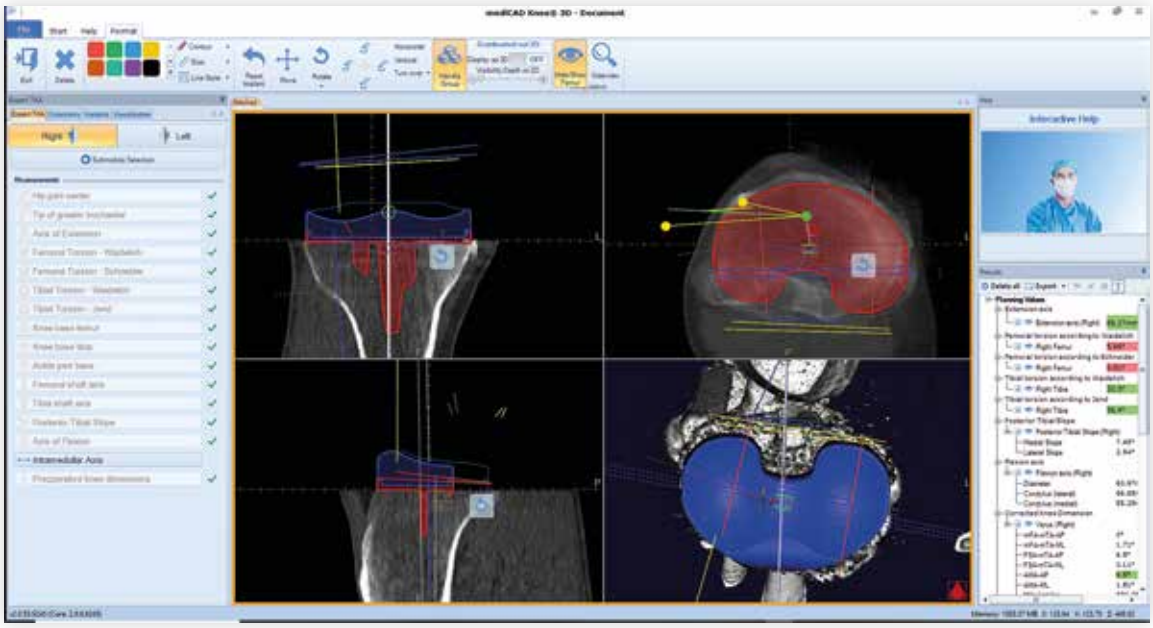


Joint replacement

mediCAD® 3D Knee offers a multitude of preoperative dimensioning and functions for planning endoprostheses.

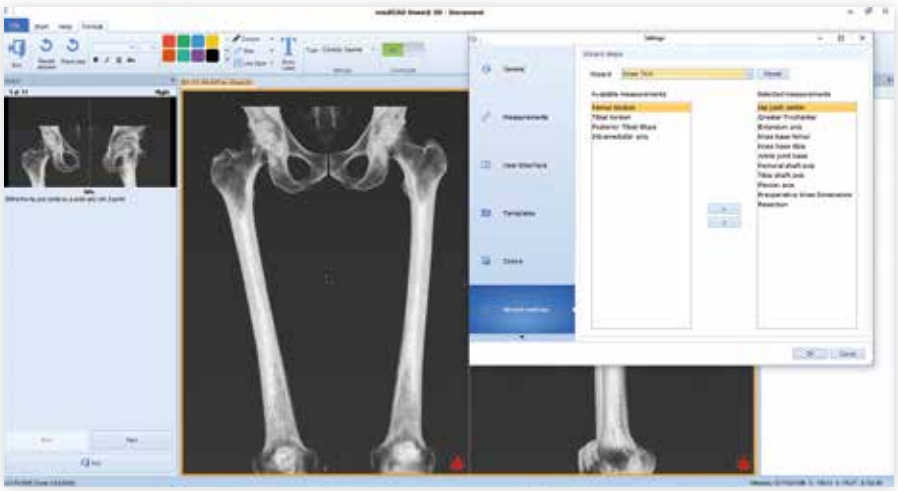
You can quickly and systematically...

- measure leg axes precisely and reliably in 3D.
- measure the posterior tibial slope.
- determine the femoral and tibial torsion.
- set the deviation to the neutral leg axis (over- or undercorrection) without difficulty for an automatic knee correction and immediately view the relevant results.
- plan implants in 3D.
- hide the femur and tibia automatically in order to precisely assess the implant size. This enables an axial view of the tibial plateau.
- significantly reduce the artifacts of pre-existing implants or completely hide the implants during revision planning.
- automatically display the rotation deviation of femoral components in relation to the transepicondylar axis or the posterior condylar tangent during prosthetic planning. You can also measure pre-existing implants in relation to the rotation.



Planning assistant Quick-TEP / Expert Mode

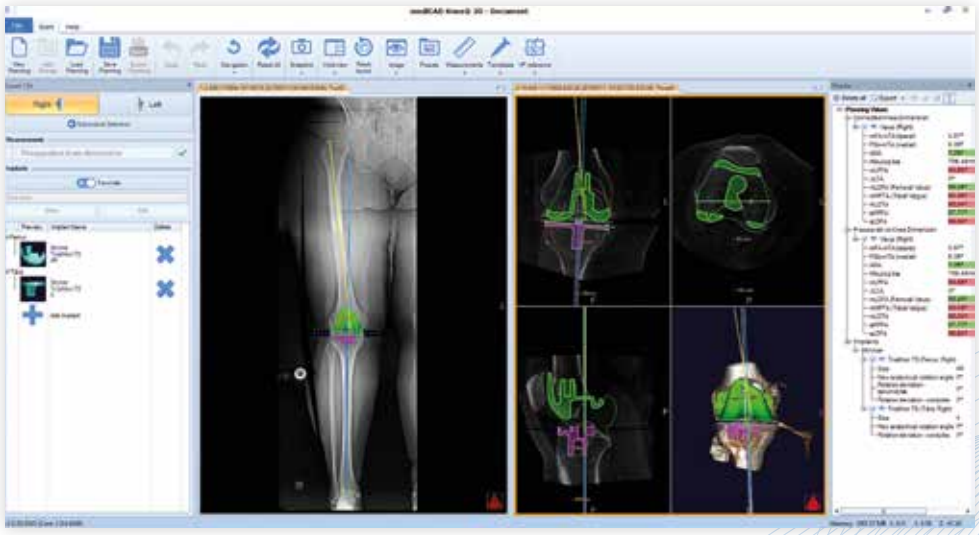
Together with the Quick Mode and Expert Mode functions, the modular structure of **mediCAD® 3D Knee** provides you with customized assistance in planning functionality. Our Quick-TEP function speeds up planning with its integrated guide that takes you through each planning stage step by step. To make this as simple as possible, there is a tutorial video for each measurement easily accessible in the plan view. The guide can be freely configured so that it covers only those measurements that are relevant for you. Selecting Expert Mode will allow you to display extra measurements and visual representations in more detail.



Hybrid prosthetic planning

You can use the hybrid prosthetic planning function to dimension the leg axis in 2D by simply matching the landmarks of a 3D knee scan with the corresponding 2D full leg image (X-ray image).

The prosthesis sizes can still be planned on a 3D model afterwards. This allows you to combine the benefits of 3D planning with a standard full leg image. This is guaranteed to reduce exposure to radiation as you need only a partial 3D scan of the knee joint in order to determine the optimum prosthesis sizes.



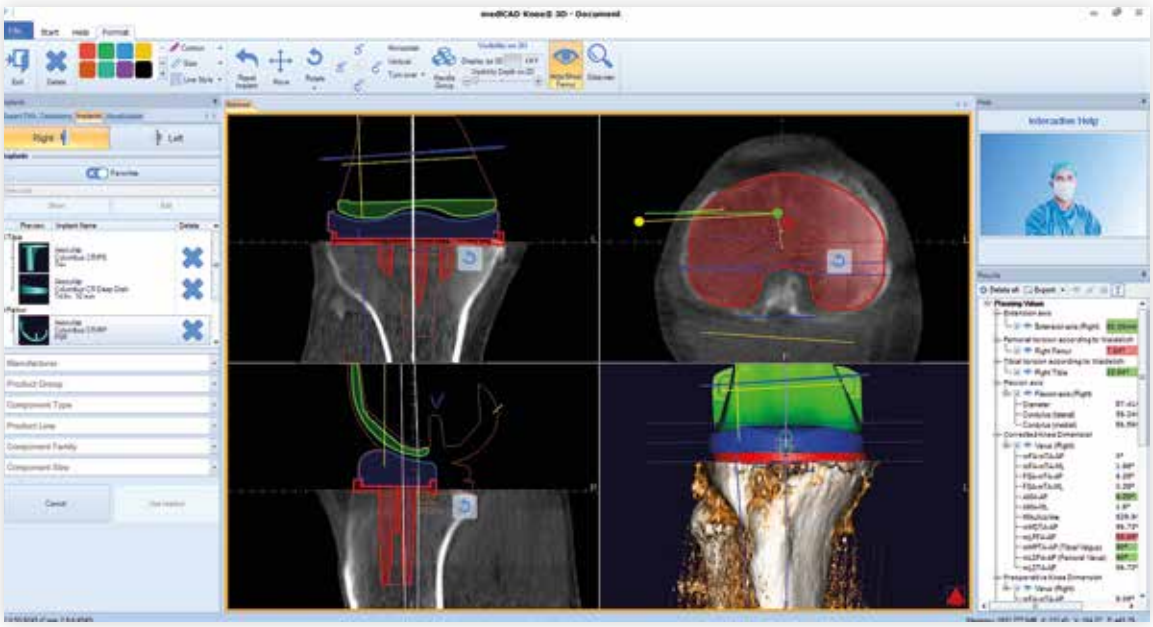
Joint replacement

Implants

Thanks to the convenient options provided by **mediCAD® 3D Knee**, the individual implant components can be assembled using the implant configurator and placed into the 3D model (the patient‘s CT images). In addition to this, the implants can be adjusted, rotated, moved, or changed to another implant type as a group or individually.

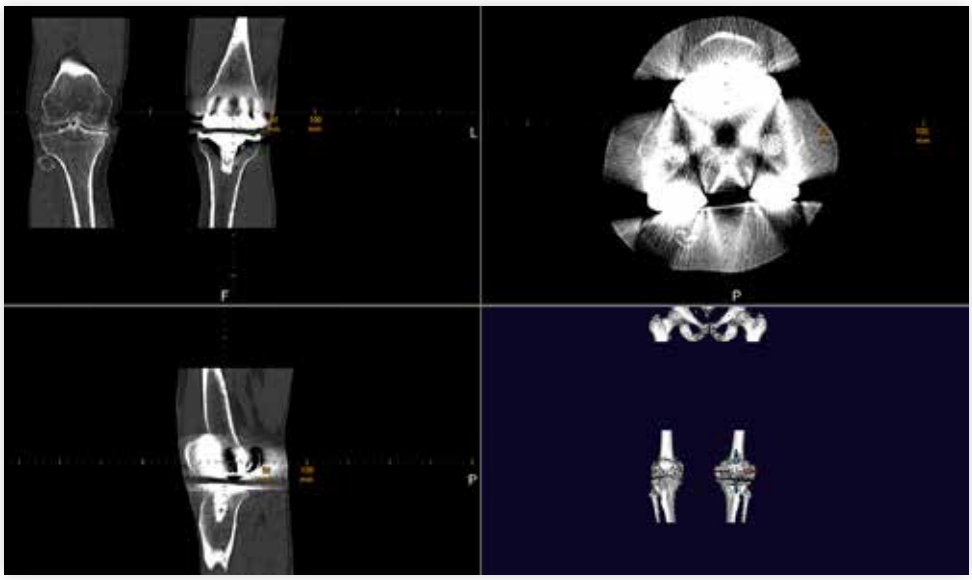
The implant configurator lets you select various knee implants. You can filter your implants by manufacturer, type, material, and size, or even list your personal favorites or those used at the hospital.
The implants you have selected and used will be compiled in a list of results with all relevant parameters and can then be used for further planning and preoperative preparation.

More than 15 years of collaboration with a large number of international implant manufacturers means that **mediCAD® 3D Knee** includes the latest expertise. It also includes an implant database that is supplemented and updated monthly.

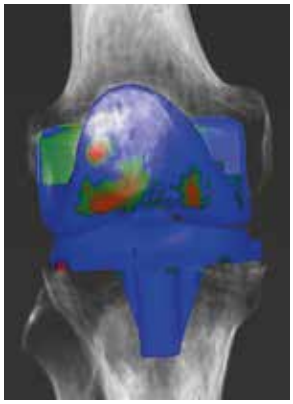


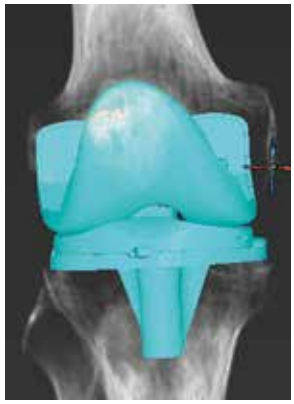
Revision planning / Reducing artifacts

Knee revisions are elaborate and complex procedures that require comprehensive planning and consideration of special implants and tools. With **mediCAD® 3D Knee**, you can reduce disruptive metal artifacts. The implants due to be revised can be displayed or hidden as needed during planning. The database contains a multitude of modular implants and special revision implants to help you optimally plan a revision procedure.



Transparent view and implant-bone contact visualization





Each image and each plan is different, with a different objective, or with different viewing requirements. You can use the transparent view to better observe the implants used in their respective positions. It is often necessary to visually determine the condition of the bone at the planned implant position. This can be done with the Hounsfield units of the bone.

Both, high and low density, values can be observed at the planned implant site. High or lower primary stability can therefore be assumed when the implants are inserted. The distance visualization of the Hounsfield units can be used to create concepts for preoperative planning to determine the correct preparation technique and the consecutive prosthetic solution.

General image functions

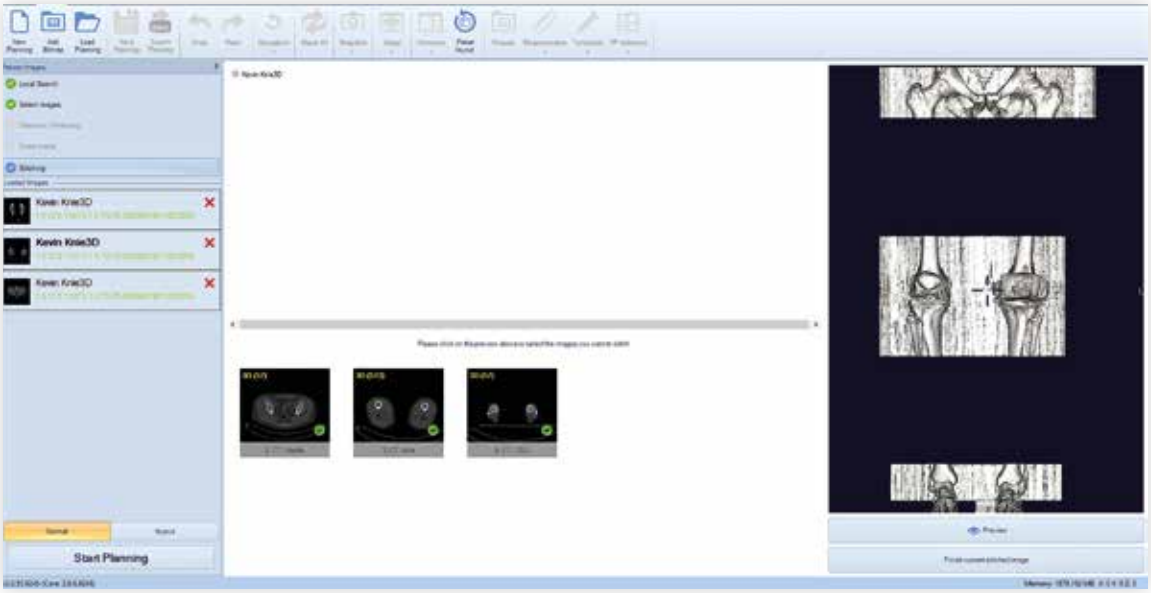
In addition to its pioneering functions for joint preservation and joint replacement, **mediCAD® 3D Knee** is proven to simplify the daily hospital routine of planning and dimensioning orthopedic knee procedures thanks to its many other additional functions. Our software helps you to save a great deal of time on work that would otherwise be necessary. This means you have much more time to spend advising your patients and actually preparing for the surgery itself.

Automatic bone segmentation and landmark detection

When you load CT data, **mediCAD® 3D Knee** performs automatic segmentation. This is an important building block in preoperative planning for knee replacement surgery. Segmentation can be used to freely display certain areas of the bone in a high-resolution, three-dimensional image. For example, segmentation can be used to make the femur more visible to determine the pathological condition of the joint.
The automatic femur, tibia and pelvis segmentation enables detection of relevant landmarks and automation of measurements, ensuring increased accuracy in planning. The user can adapt and optimize the landmarks at any time to achieve even greater accuracy. By setting an incision area, you can perform an osteotomy and move or rotate the resected areas as needed. All dimensions are adjusted automatically and thus reflect the new situation after the performed correction. This allows you to simulate and test various scenarios to achieve the optimal result for the patient.

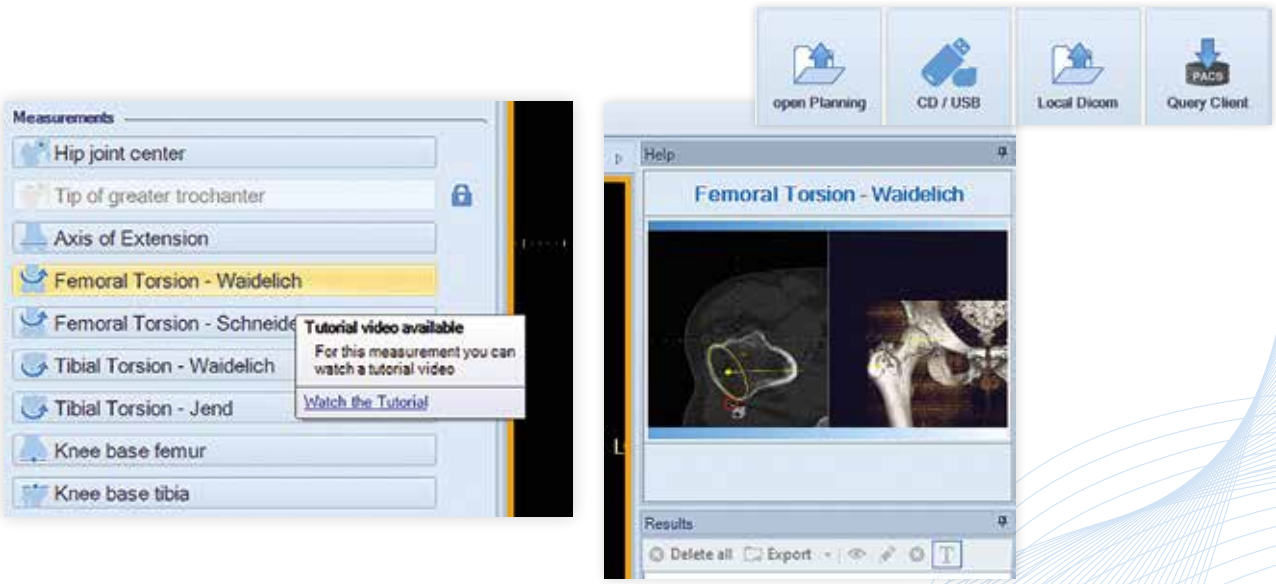
Stitching with individual sectional images

Combining individual sectional images (hip joint, knee centers and talus) to a contiguous object lets you measure the entire leg in various dimensions. This is possible even if only partial sections need to be recorded during imaging.
This means a significant decrease in radiation for your patient, but with the same quality of planning.



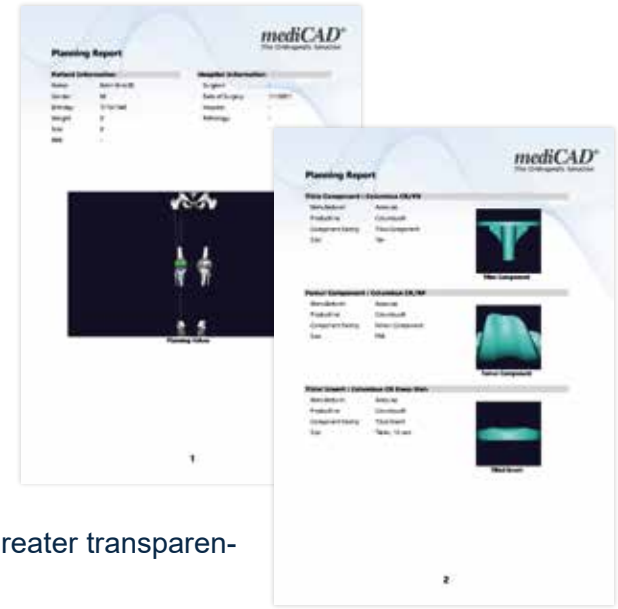
Assistant / Interactive help

mediCAD® 3D Knee lets you select the storage location of your patient data or images with just one mouse click. You can load the images as you usually would from the PAC system via our new **mediCAD®** interface Query Client®. You can also call up any previously stored plans and load them immediately into the work area for further processing.
After selecting the respective storage location, all the available patient data that is stored in the selected directory and subdirectory is displayed in the work area of **mediCAD® 3D Knee.**
During your surgical planning, you will be provided with an interactive help, which supports you with a schematic view and a list of all the required steps.
In addition, easy to understand informational texts and images are used to highlight the respective areas and functions in the application. This means will you always have all the information you need in view, making your work easier and faster.



Other functions

Planning Report



mediCAD® not only provides a convenient PACS connection and audit-safe storage for your planning work, but also lets you save or print your work as a report.

Once the plan is complete, the software creates a structured report in which all the relevant information, such as patient ID, dimensioning and planned implants, is displayed and listed. You can then use this report to discuss your planning with colleagues or patients, saving time and enabling greater transparency and certainty.

mediCAD® Services / 3D Printing

It will soon be possible to access further mediCAD Hectec GmbH services direct from the **mediCAD®** software. mediCAD Hectec GmbH's new service portal, **mediCAD® Services**, will be your port of call, be it for ordering 3D prints, preparing customized implants or logistics projects.

The first service to become available is provided by **mediCAD®** 3D Printing, which will allow you to order a 3D model of a previously segmented bone structure based on your planning direct from **mediCAD® 3D Knee**.

As the software is directly integrated into **mediCAD®**, requests for services are forwarded to **mediCAD® Services** (services.mediCAD.cloud). The ordering process for a 3D print is straightforward and systematic, and the model is shipped to you within a maximum of five working days (for recipients in Germany).

Manufacturer information

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Hardware recommendations
mediCAD® 3D Knee requires Windows 10, 64 Bit with .NET Framework 4.5 and a current processor with at least 4 x 4 GHz and at least 8 GB RAM. Recommended display resolution: Full HD. No diagnostic monitor is required.

Templates
We are happy to integrate your preferred manufacturers' implants and accessory templates into the system. Please contact us for further information.

Introduction / Training
mediCAD® 3D Knee requires no prior program knowledge and is easy to learn. The user is intuitively guided through the program and all instructions are displayed in plain text on the interface.
Training generally takes approximately 3-4 hours to complete. **mediCAD®** Hectec can offer you qualified training sessions for each module. The training sessions can either be conducted at your workplace or online via the internet. X-ray images are read in the DICOM® format via an interface of your PACS/RIS system. **mediCAD® 3D Knee** communicates with all DICOM® interfaces making it compatible with all PAC systems. Many common image formats can also be imported.
We would love to present you with **mediCAD® 3D Knee** solution! Our sales team is happy to help and is available to answer any questions you may have.

Demo version
Order your free demo version of **mediCAD® 3D Knee**. The demo version corresponds to the full version of the **program and is valid for 90 days**.
There are no restrictions on the functionalities or the implant database in the demo version.

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