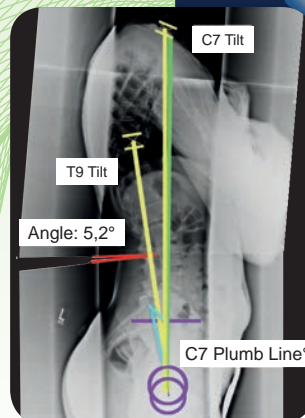
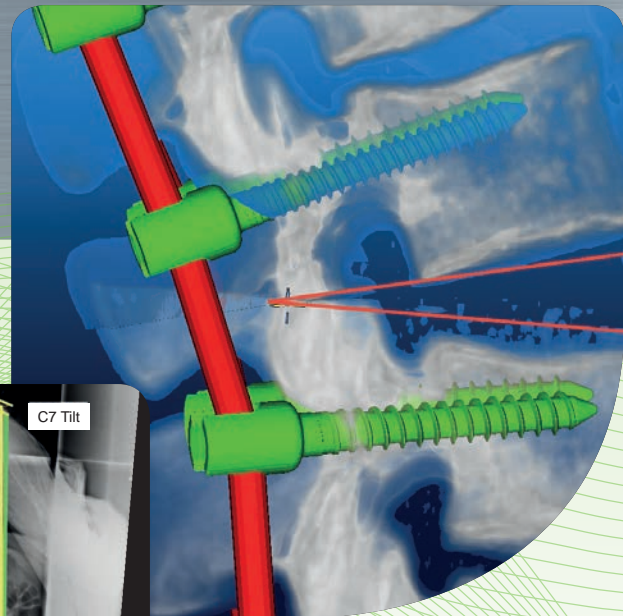
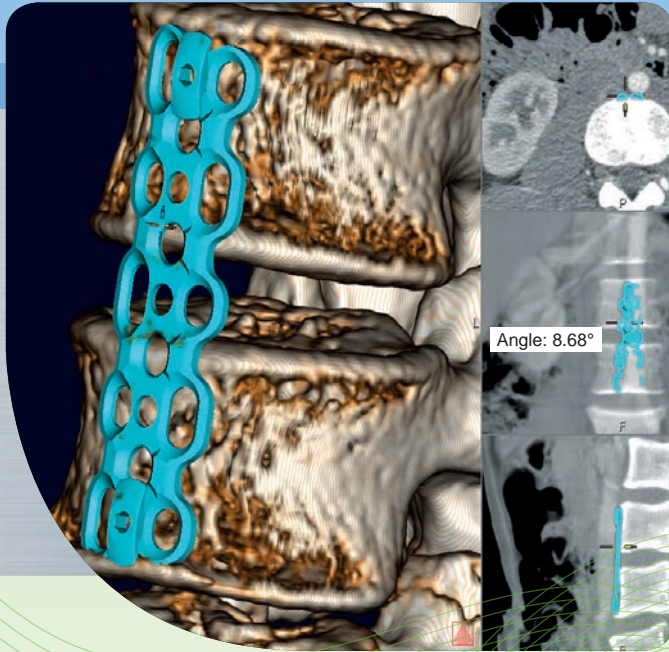


# SPINE 3D

Sagittal balance · Automatic measurement  
Spondylodesis · Implants · Osteotomy



Sagittal balance

**mediCAD<sup>®</sup>**

Hybrid Solution 2D/3D

[www.mediCAD.eu](http://www.mediCAD.eu)





## Your powerful tool for the spine surgery of tomorrow.

**mediCAD Spine® 3D** offers you entirely new possibilities in terms of carrying out the anatomical assessment, planning and measurement of the spine, thereby implementing optimal, audit-compliant operation preparation.

**mediCAD Spine® 3D** introduces you to entirely new possibilities for assessing, planning and measuring the anatomy of the spine and thus achieving an optimal and revision-safe surgery preparation.

You can in 3D space using CT and MR data, as well as with classic 2D x-ray images (e.g. DICOM or JPEG). For the first time, thanks to the powerful hybrid planning system, you can also work with 2D and 3D images at the same time and therefore obtain the best possible measuring, analysis and planning results.

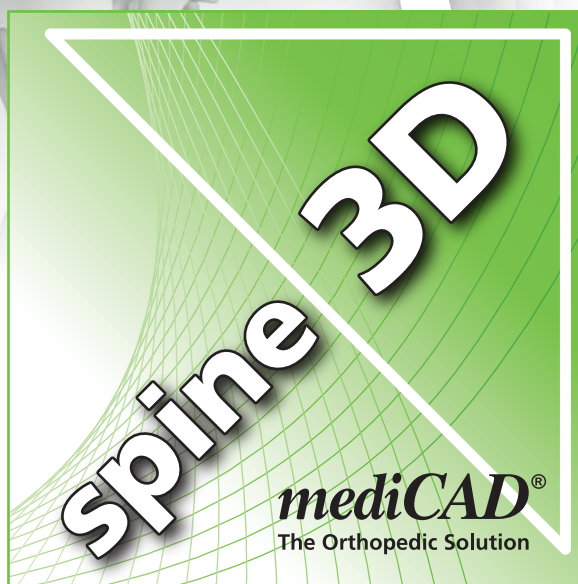
The new modern and intuitive user interface takes you directly where you want to go and is conveniently paired with the existing connection to the PAC system in your clinic! These are just two of the many reasons that make **mediCAD Spine® 3D** an indispensable tool for your day-to-day work.

### The key features are described in the pages that follow:

- Automatic segmentation
- Hybrid planning in 2D+3D
- Osteotomies
- Automated measurements
- Sagittal balance
- Pedicle screws & implants
- Spondylodesis
- Conventional measurements
- Visualization
- Interactive help
- Registry connection
- Navigation connection

**mediCAD Spine® 3D** includes an established integration with the systems of our existing PACS and HIS partners, as well as a direct connection to the European Spine Register SPINE TANGO.

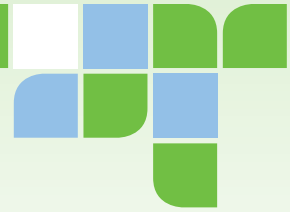
**mediCAD Spine® 3D** was developed in close collaboration with renowned spinal surgeons. Constant development and improvement is the core mission of our company.



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### 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.

Not only does **mediCAD Spine® 3D** provide quality assurance to your patients, it also saves time that you previously spent during actual surgery. In other words, this gives you significantly more time for consulting with your patient and preparing for 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 consultations in your clinic should be more accessible and transparent and should offer easy-to-understand quality improvements and assurances.

We would be happy to share with you the testimonials of more than 20,000 clinical users around the world who have successfully started using **mediCAD®**. We feel confident that you will appreciate the usefulness of the well-conceived product design and user-friendly operation that is updated monthly, as well as the modern digital product catalogue for implants.

Don't hesitate to arrange a free and non-binding demonstration of our system. We look forward to hearing from you soon.

Best wishes,  
**mediCAD® Hectec GmbH**



Arrange a meeting with our sales team today and we will present you with today's number 1 solution in digital surgery planning!

Phone: +49 871 330 203-0  
E-Mail: [sales@hectec.eu](mailto:sales@hectec.eu)

### INFORMATION

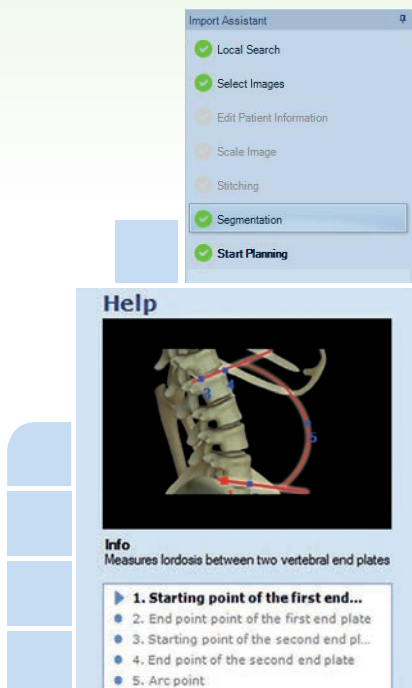
Our systems have been developed by doctors for doctors; for you and your patients, this means:

- **mediCAD®** is the world's first and most used planning program on the market
- Established planning methods have been taken into account
- A modular design with powerful add-on modules
- Easy and intuitive to use
- All processes are documented in compliance with legal requirements
- Up to 90% time savings compared to conventional planning
- Cooperation with 130 international implant manufacturers
- **mediCAD®** is certified under Directive 93/42/EEC and EN ISO 13485 and is an approved medical device
- 510(k) approval for **mediCAD®** was granted by the FDA (K140434)
- Medical Device License of Health Canada received on August 11th, 2015 (MDL 95559)
- **mediCAD®** is under continuous development
- Non-standard and special functions/modules are constantly being planned and produced
- **mediCAD®** has been successfully used in the healthcare sector for 20 years

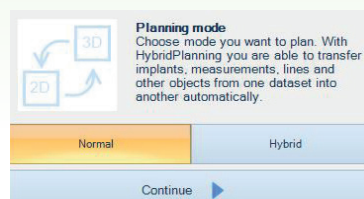
Made in Germany



## mediCAD Spine® 2D and 3D



## Import wizard/Interactive help



An intuitive support tool was implemented to highlight the innovative and simple operating concept of **mediCAD Spine® 3D**.

The import assistant supports you step by step with the preparation for your plan.

It guides you through the selection of the planning mode, local search, image selection and finally x-ray image scaling or segmentation of your 3D model. Tutorial videos are provided to ensure better understanding and interactive help is available at all times during your planning process. This helps you with the schematic representation and a list of all of the steps to be carried out. Informative texts and images of the relevant areas and functions being used are also highlighted in a clearly understandable manner. This means you always have all of the supporting information you need at a glance, facilitating and accelerating your work.

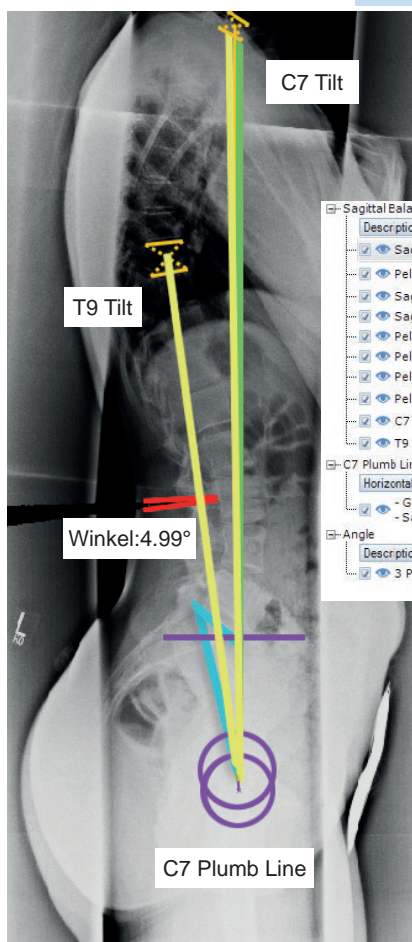
The connection to Thieme eRef means that doctors receive situation-based and case-based, comprehensive medical information from current literature at all times during their digital operation planning.

## Sagittal balance

The benefit of hybrid planning and the resulting interaction between x-ray and CT images is that **mediCAD Spine® 3D** offers a significant improvement to your usual procedures – unlike sagittal balance measurements that are otherwise only possible with 2D images. With this system, measurements made on 2D

images can be automatically transferred to and ultimately used as the basis for planning on the 3D model.

Sagittal balance measurements can be executed in a single operation on **mediCAD Spine® 3D** using a function that intuitively guides the user. By setting just a few required reference points, all values are automatically calculated, plotted and measured. As with automated measuring, the results are documented in a structured list and, when applicable, evaluated against normal ranges.



| Description              | Value     |
|--------------------------|-----------|
| ✓ Sacral Slope SS        | 38.42°    |
| ✓ Pelvic Tilt PT         | 8.36°     |
| ✓ Sagittal Pelvic Thi... | 15.95 mm  |
| ✓ Sagittal Pelvic Thi... | 109.73 mm |
| ✓ Pelvic Angulation PA   | 13.74°    |
| ✓ Pelvic Sacral Angl...  | 43.23°    |
| ✓ Pelvic Lordosis An...  | 37.84°    |
| ✓ Pelvic Incidence PI    | 45.77°    |
| ✓ C7 Tilt                | 0.27°     |
| ✓ T9 Tilt                | 7.99°     |
| C7 Plumb Line            |           |
| Horizontal distance to   |           |
| ✓ Gravity line           | 0.01 mm   |
| ✓ Sacrum dorsal          | 29.08 mm  |
| Angle                    |           |
| ✓ 3 Points               | 4.99°     |

The following important values in spine surgery can be measured using this function:

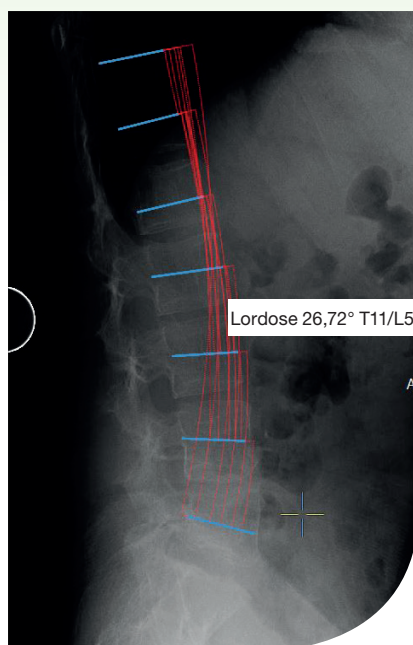
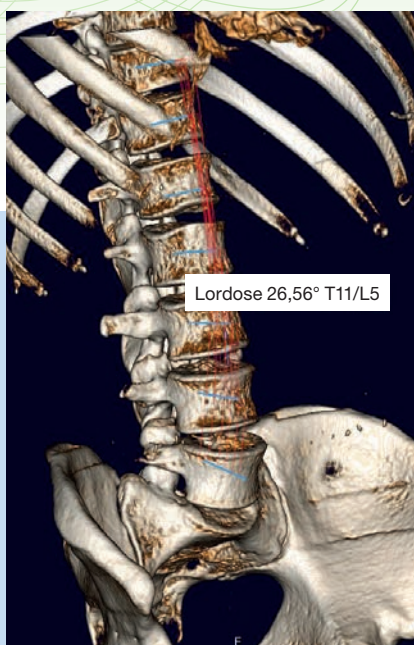
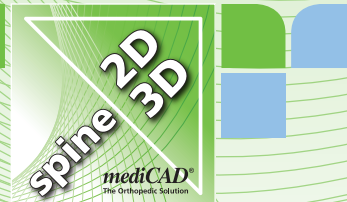
- Sacral Slope SS
- Pelvic Tilt PT
- Pelvic Thickness SPT
- Pelvic Thickness CS
- Pelvic Angulation PA
- Pelvisacral Angle PSA
- Pelvic Lordosis Angle PLA
- Pelvic Incidence PI

You then have the option to measure and plot the following additional values:

- T9 Tilt
- C7 Tilt
- C7 Plumb Line

With just a few clicks, **mediCAD Spine® 3D** provides you with all the important data you need for further planning.



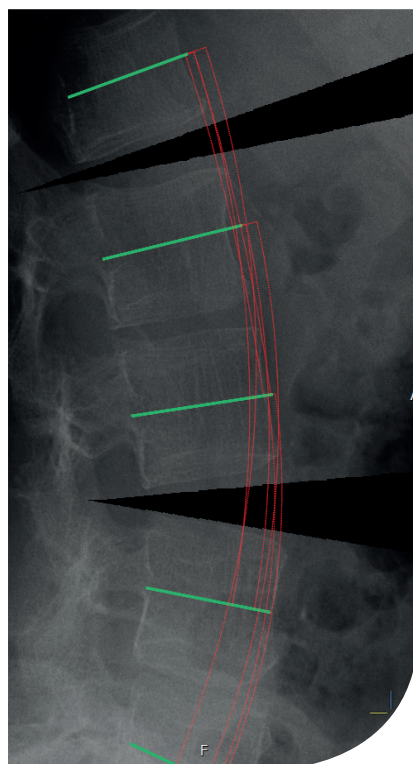
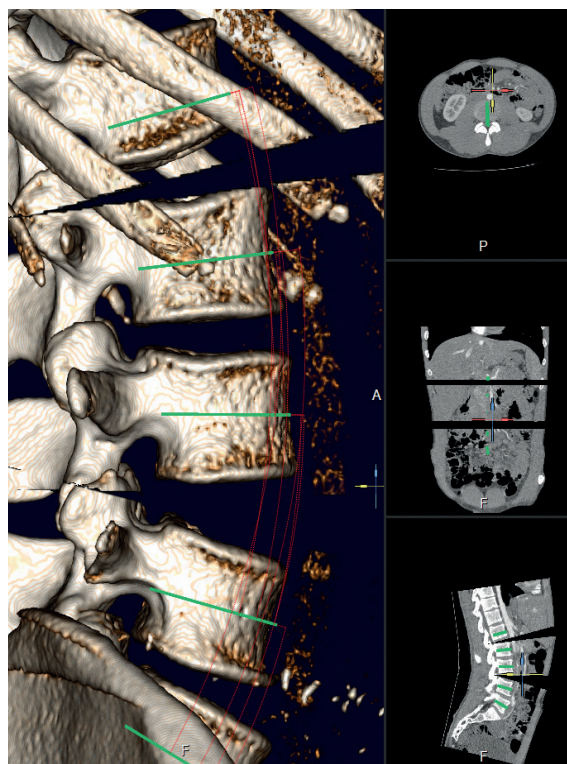


## Hybrid planning 2D and 3D

The innovative hybrid planning that is intuitive to operate and is one of the high-performance core functions of **mediCAD Spine® 3D**

For the first time ever, it is possible to load both 2D and 3D image data from the patient simultaneously into the planning process. By setting just a few reference points in relation to each other, both images can be correlated and displayed at the same time.

Through complex algorithms and analyses of the image data loaded, the differences in the figures, which arise for example as a result of images being taken while standing or lying down, can automatically be taken into account and converted. This means, for example, that lordosis can be compared when worked or relaxed.



The hybrid planning feature also means that all other functionalities of **mediCAD Spine® 3D**, described on the following pages, can be automatically performed in both 2D and 3D at the same time.

Regardless of whether it's measurements, spondylodesis or complex osteotomies, all of the actions carried out are shown and updated in real time on all images and at all levels.



## mediCAD Spine® 3D

| Results           |        |
|-------------------|--------|
| Delete all Export |        |
| Lumbar Spine      |        |
| Lordosis          |        |
| Description       | Angle  |
| L1/L2             | 0.76°  |
| L1/L3             | 7.62°  |
| L1/L4             | 8.91°  |
| L1/L5             | 25.12° |
| L2/L3             | 6.98°  |
| L2/L4             | 8.3°   |
| L2/L5             | 24.59° |
| L3/L4             | 1.46°  |
| L3/L5             | 17.97° |
| L4/L5             | 16.63° |

## Automated measurements

On CT images that have already undergone automatic segmentation, you can perform and document numerous conventional measurements automatically:

- Scoliosis using Cobb's method
- Scoliosis using Ferguson's method
- Interpedicular distance
- Lordosis
- Kyphosis
- Intervertebral disc height
- Intervertebral disc angle
- Spondylolisthesis
- Instability using van Akkerveeken's method

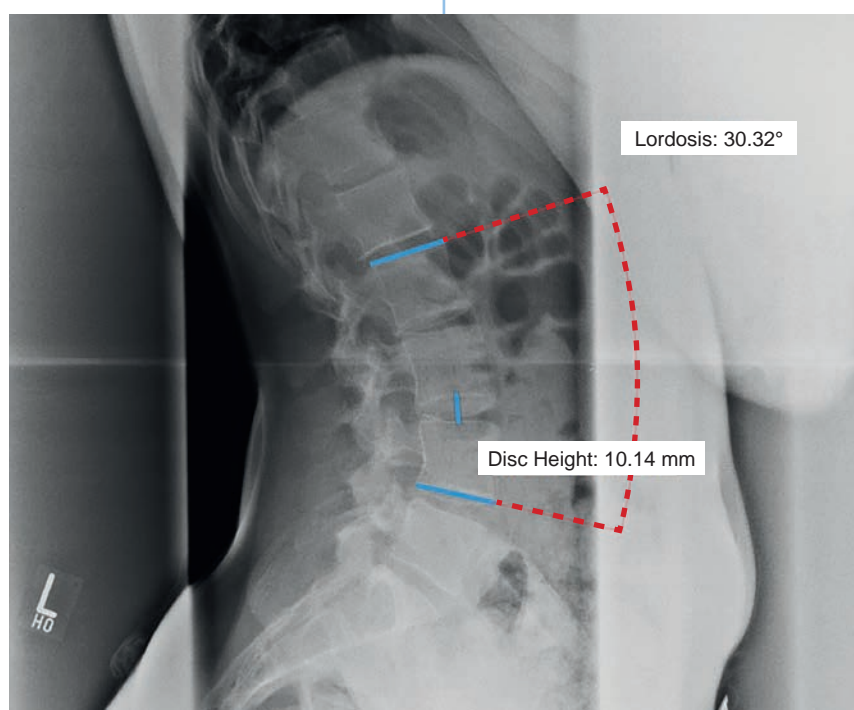
The results of the measurements are both displayed directly on the 3D model and recorded in a structured list of results. Where possible, an analysis based on the normal ranges is performed and positive or negative deviations are highlighted with a corresponding colour.

This way, **mediCAD Spine® 3D** enables you to use your time more efficiently on these tasks. This gives you significantly more time for consulting with your patient and preparing for surgery.

## Conventional measurements

In addition to the automated measurements, all conventional measurements can still be performed manually.

**mediCAD Spine® 3D** has the option to perform the following measurements in simple and comfortable operation:



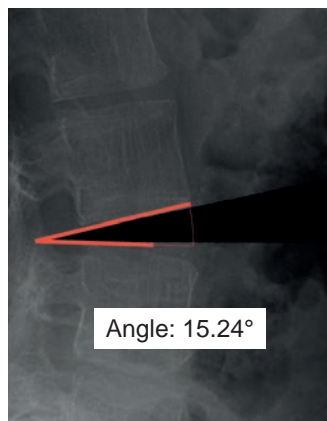
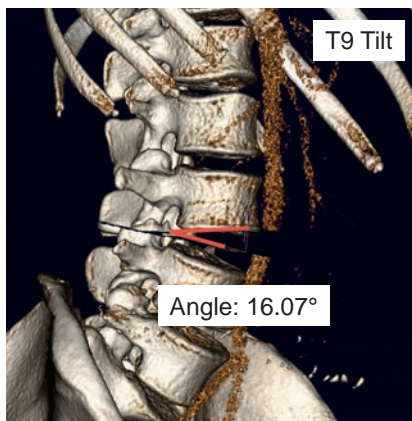
- Distance measurement
- Angle measurement
- Risser's sign
- Scoliosis using Cobb's measurement
- Scoliosis using Ferguson's measurement
- Interpedicular distance
- Spinal canal width
- Spinal canal diameter
- Lordosis
- Kyphosis
- Atlantodental interval
- Dens perpendicular
- Intervertebral disc height
- Intervertebral disc angle
- Spondylolisthesis
- Instability using van Akkerveeken's method
- Sacral angle



## Osteotomy

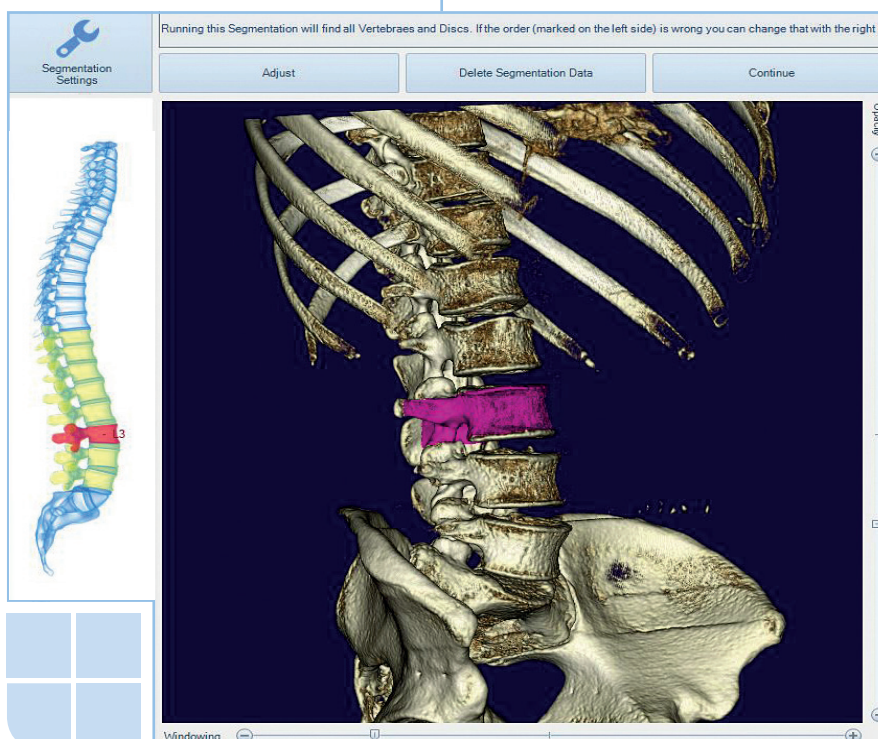
By specifying individual cuts or cut areas, you can perform one or more osteotomies and the resected areas can be moved or rotated as required. All measurements are automatically adjusted to reflect the new situation after performing the correction.

This technique allows you to simulate and check out various situations to find the best result for the patient. Thanks to hybrid planning, all osteotomies and the measurements taken before and after in the 3D image are automatically transferred to the 2D image and vice versa.



The effects of each action on the sagittal profile of the patient can be monitored and depicted in real time. If specified, you can also perform an automatic alignment based on previously measurement parameters once an osteotomy is completed. In addition, **mediCAD Spine® 3D** can optionally suggest the optimal resection angle. This action facilitates automatic restoration of a harmonic spine profile for your patient.

## Automatic segmentation

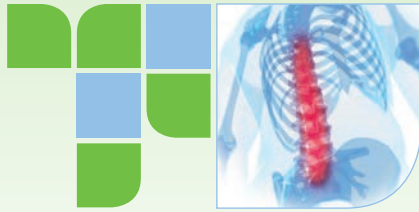


When you load CT datasets, **mediCAD Spine® 3D** automatically segments the 3D model.

Your image is precisely analyzed and compared with the dataset stored in the software, so based on this, all of the vertebrae and discs present in the image can be recognized and precisely categorized.

With the aid of a diagram of the spine, the vertebrae detected are depicted schematically and can then be adjusted or corrected manually if required.

Automatic segmentation helps you in the long term for later planning. It enables automatic measurements, automatic insertion and the placing of pedicle screws in the correct vertebra and spondylolysis.



mediCAD Spine® 3D

## Pedicle screws and implants

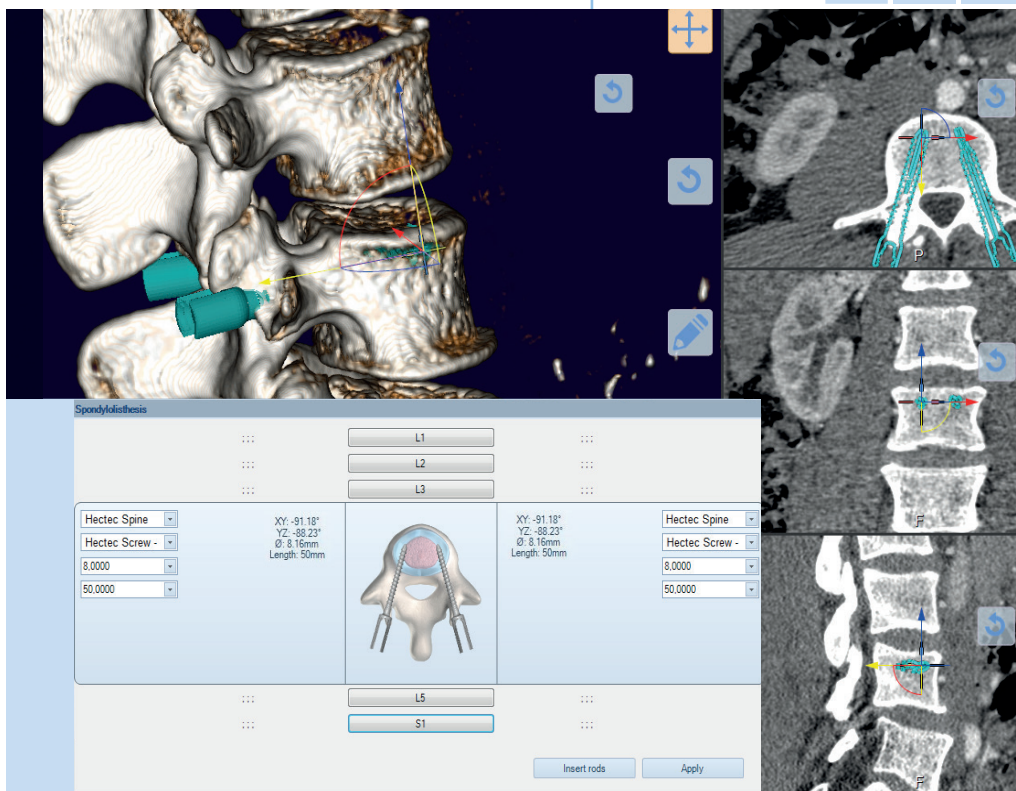
**What screw length is required? What is the ideal entry angle?**

**How deep should or can the screw be inserted?**

**How long is the required rod and which way should it be curved?**

**And which implant is best suited to a specific spine situation?**

**These questions and many more are answered by the convenient capabilities of mediCAD Spine® 3D.**



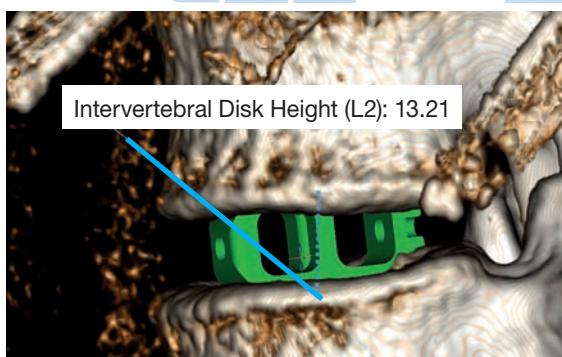
The screw tool allows you to select from a variety of screw types and lengths. On a segmented 3D model, you also select the target vertebra and the screw side. The pedicle screw is automatically plotted in a standard position on the 3D model and you can adjust, rotate, shift, insert or switch to a different screw type or length entirely.

The implant tool allows you to select from a range of different spine implants, such as cages, plates, vertebral replacements or disc prostheses. These too can be plotted on the 3D model and further adjusted as required. While doing so, you can use the implant tool to filter the implants based on manufacturer, type, material and size or simply list only your personal favorites or those most used in your clinic.

When several views are being used simultaneously (e.g. 3D model and 2D slices), each adjustment is automatically shown in all views. In hybrid planning mode, a single adjusted image is displayed for each change. This allows you to try several alternative versions to find the ideal position for each specific patient, assessing each option on a base-by-base case.

All the implants you select and use are documented in the structured results list, including all relevant parameters, and can then be used for further planning and pre-operative preparation.

Thanks to more than 15 years' collaboration with numerous implant manufacturers around the world, **mediCAD Spine® 3D** includes the most up-to-date knowledge and an implant database that is updated and added to on a monthly basis.







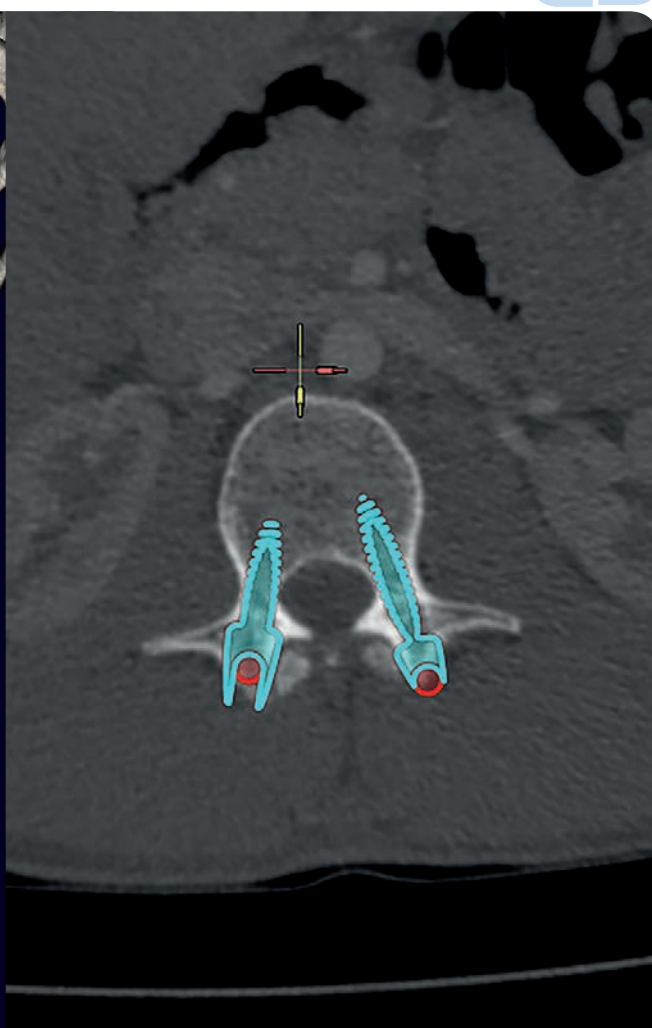
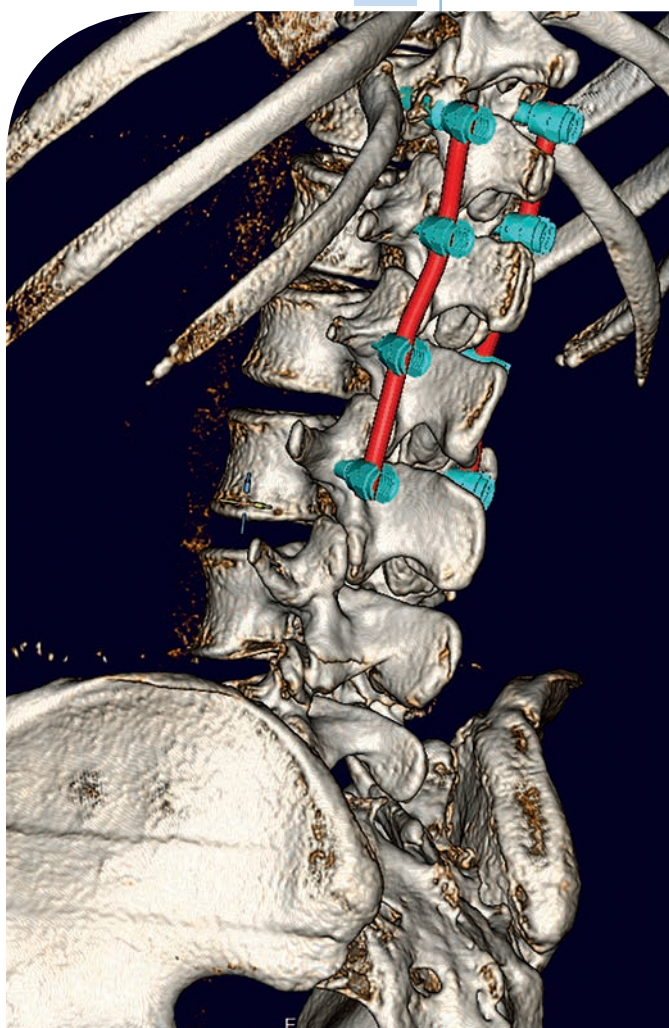
## Spondylodesis

**mediCAD Spine® 3D** offers a convenient, innovative and easy-to-use solution for planning spondylodesis. You are guided by a built-in wizard and (ideally in conjunction with sagittal balance and osteotomies that have already been performed) can simulate the restoration of a healthy patient anatomy.

Once you have selected all required vertebrae and pedicle sides, you can automatically insert all the necessary screws and rods.

In the hybrid-planning mode, all results are also automatically converted and shown in the other image.

All screws and rods inserted automatically with this function are documented in the structured results list, including all relevant parameters, and can be used for further planning and pre-operative preparation.







## Visualization

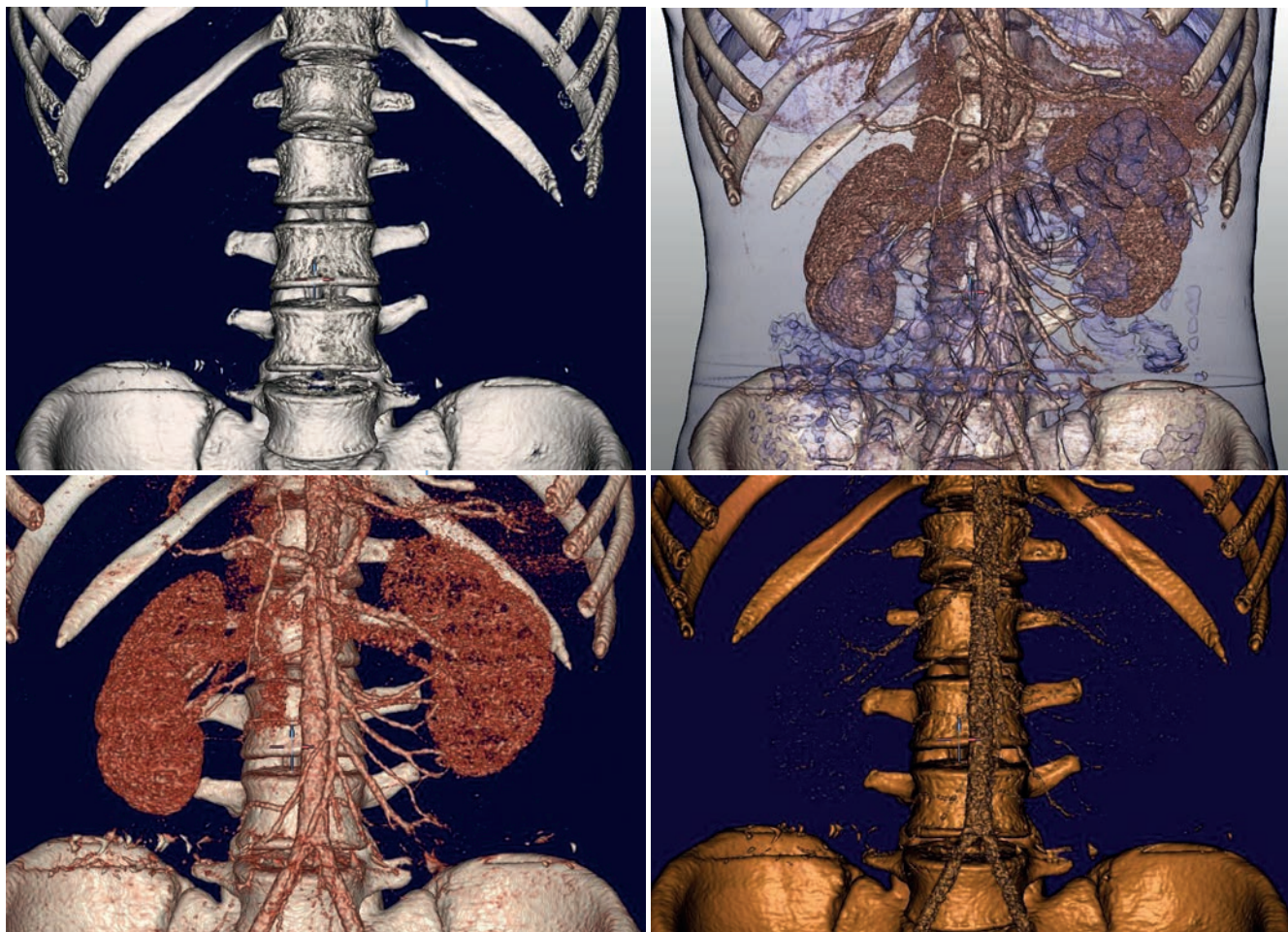
Every image and plan is unique and pursues a different objective and demands a new approach. This means it is sometimes necessary to display image data from various points of view.

**mediCAD Spine® 3D** offers a wide range of different visualization options to address this challenge.

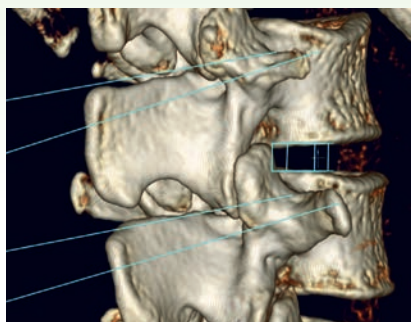
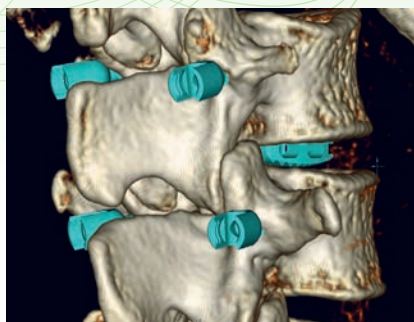
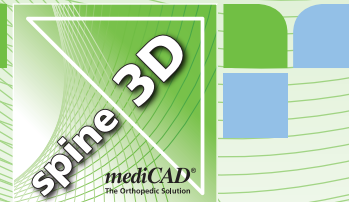
In addition to the 3D model that can be viewed from all angles, you can also view individual 2D slices in axial, sagittal and coronal planes. Further, you can even display and view the 3D model in several different perspectives at the same time.

Organs and tissue can be shown or hidden, letting you see the inside of a patient and even consider each vessel and muscle pathway for you planning. Surfaces can be displayed with various filters and can include various parameters.

Individual vertebrae can be shown or hidden and you can directly focus on them or display them as a detailed section of the image and highlight them in color.







## Navigation

With **mediCAD Spine® 3D**, you have the option to use pre-operative planning data even during a navigated spine surgery.

This allows you to review, more precisely, during surgery, whether it be a pedicle screw or a cage, they will be more accurately positioned according to the planning session.

## Manufacturer information

**mediCAD Spine® 3D** requires Windows 7-10, 64-bit with .NET Framework 4.6.1 and an up-to-date processor with a minimum of 4 x 4\*2,6 GHz and at least 8 GB RAM. The recommended display resolution is 1920 x 1080 – FULL HD. A diagnostic monitor is not required.

**mediCAD Spine® 3D** requires no previous knowledge of the program and is easy to learn. The user is guided intuitively through the program with all instructions displayed in plain language on the interface. Training usually requires approximately 3-4 hours.

**mediCAD Hectec** offers you skilled training sessions for every module. Both on-site and online training is available. X-ray images are imported into DICOM® format via an interface on your PAC/RIS system. **mediCAD Spine® 3D** communicates with all DICOM® interfaces, making it compatible with any PAC system. Many common image formats can also be imported.

## Accessories



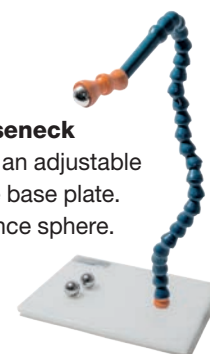
### Reference sphere Ø 25 mm

The lightweight hollow sphere is made of stainless steel and is used for scaling x-ray images.



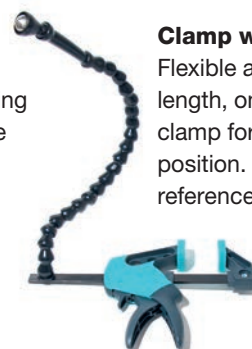
### Disposable adhesive pads

Pads for easy positioning of the reference sphere on the bone level.



### Table with gooseneck

Flexible arm with an adjustable length, on a large base plate. Integrated reference sphere.



### Clamp with gooseneck

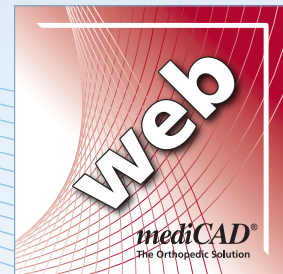
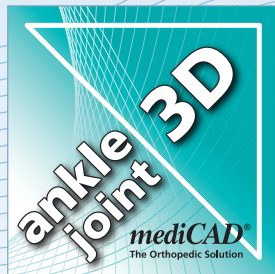
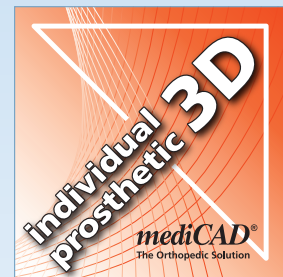
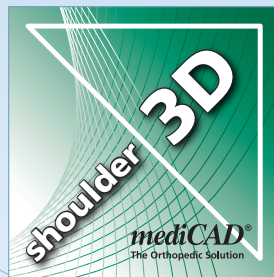
Flexible arm with adjustable length, on a convenient clamp for x-rays in standing position. Integrated reference sphere.

Recommended hardware ➡

Training - 3D ➡

# Successful surgery by digital planning

## Additional products by mediCAD Hectec



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