



Hybrid Solution 2D / 3D

mediCAD Spine[®] 3D



**Your powerful tool for
spine surgery of
tomorrow!**



Your powerful tool for spine surgery of tomorrow!

Our new software product **mediCAD Spine® 3D** introduces you to entirely new possibilities for spine planning and measuring. It is now available as a preview version.

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

A modern, intuitive and directly target-aimed user interface, combined with our usual comfortable connection to the existing PACS system of your hospital – these are only two of the many benefits making mediCAD Spine 3D an essential instrument for your daily work.

The most important characteristics are described on the following pages:

- **Automatic Segmentation**
- **Hybrid Planning 2D+3D**
- **Osteotomy**
- **Automatic Measurements**
- **Sagittal Balance**
- **Pedicle Screws & Implants**
- **Spondylodesis**
- **Classic Measurements**
- **Visualization**
- **Interactive Help**

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

mediCAD Spine® 3D was developed in close cooperation with a number of spine surgeons. It is available starting early 2014. Register and reserve today in order to be a part right from the start.

Our sales team is at your disposal and happy to answer any further questions.

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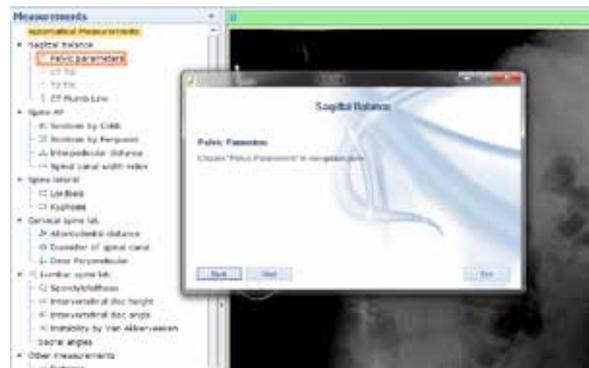
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	Index
	Interactive Help.....3
	Automatic Segmentation.....3
	Hybrid Planning 2D & 3D.....4
	Automatic Osteotomy.....5
	Measurements6
	Sagittal Balance.....7
	Pedicle Screws & Implants8
	Spondylodesis9
	Visualization.....10
	Manufacturer Info..... 11

In order to emphasize and highlight the innovative and easy usability concept of **mediCAD Spine® 3D**, several intuitive support tools were implemented.

Each function or each tool contains a guide with a schematic illustration and/or a list of steps to be executed.

All supportive information is provided at a glance, your work is simplified and accelerated.



Additionally, multiple interactive tutorials are available, guiding you through all procedures of the respective function step by step.

Aside from providing comprehensive information text and images, the particular corresponding areas or functions of the software are highlighted.

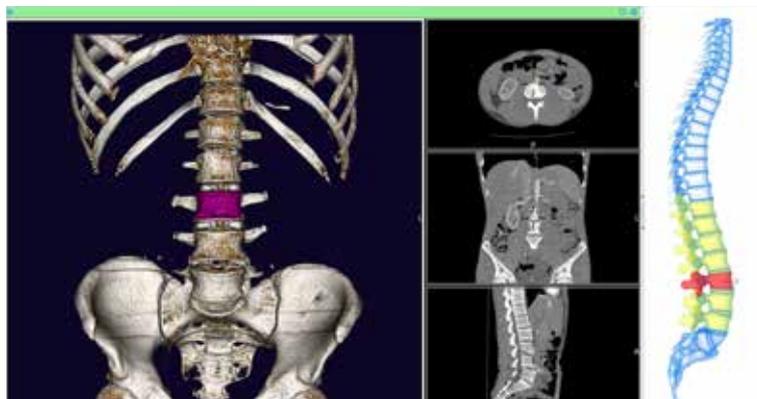
Automatic Segmentation

Once you open CT image data, **mediCAD Spine® 3D** performs an automatic segmentation of the 3D model.

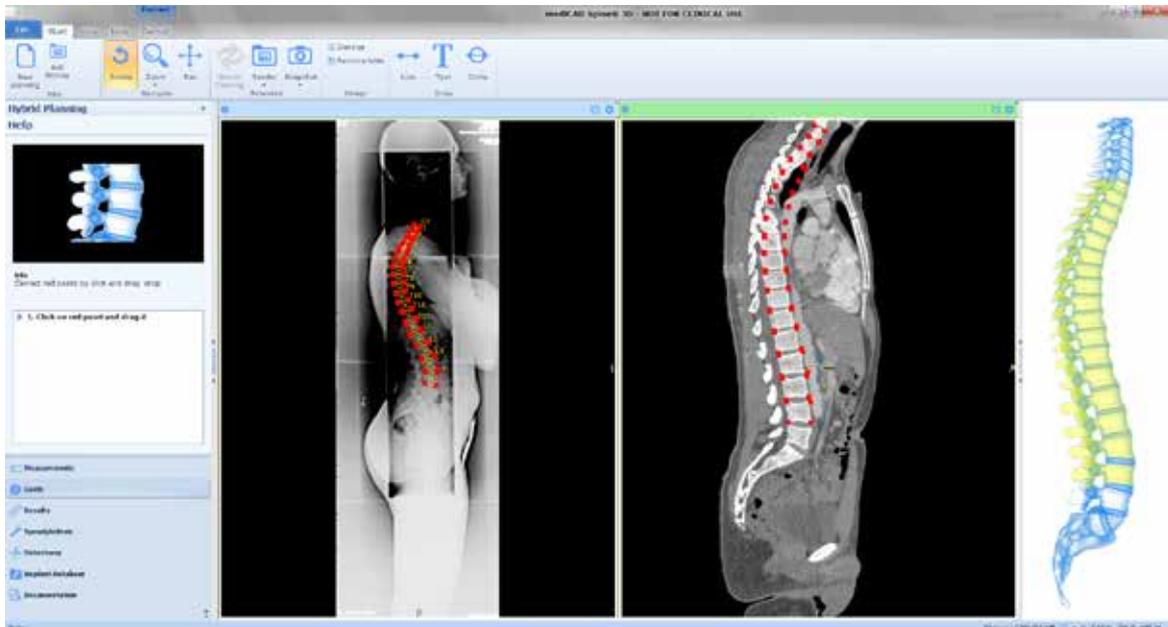
During this process, your recording is precisely analyzed and compared to the data repository of the software. This allows for an automatic match and precise allocation of all detected vertebrae and disks in the recording.

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

The automatic segmentation considerably enhances the subsequent planning and after all enables the automatic measurements, automatic insertion and placement of pedicle screws in the correct vertebrae, as well as spondylodesis.



Our easy to use, innovative hybrid planning solution is one of the most powerful core functionalities of **mediCAD Spine® 3D**.



For the very first time it is now possible to load 2D and 3D image data of a patient simultaneously into a planning. By setting just a few reference points, both images are correlated with each other and displayed at the same time.

Due to complex algorithms and elaborate analysis of the loaded image data, the differences in both images (resulting e.g. from being taken in standing or prone position) are automatically taken into consideration and converted. This allows, for example, the assessment of a lordosis under strain or in relief.

All other functionalities of **mediCAD Spine® 3D** described on the next pages can be automatically performed in 2D as well as 3D thanks to hybrid planning.

No matter if measurements, spondylodesis or complex osteotomies – all performed actions are displayed and updated in real time in all images and views.



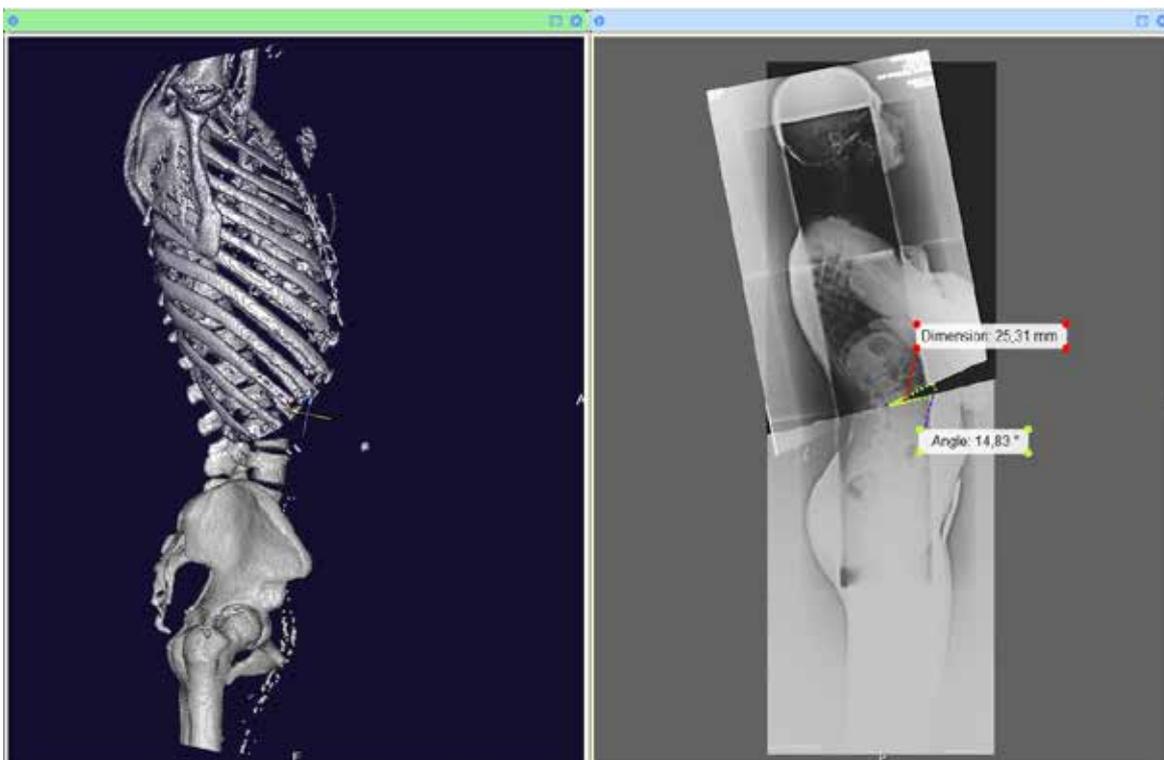
In order to adjust short and long range kyphoses, lordoses and scolioses with the purpose of restoring a harmonic spine profile, **mediCAD Spine® 3D** offers the planning of osteotomies on the vertebrae.

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

This way, various scenarios can be simulated and tried out, finding the best result for the patient. Thanks to hybrid planning, all osteotomies performed on the 3D image are automatically transferred to the 2D image, and vice versa.

The results of each performed action on the sagittal profile of the patient can be monitored and illustrated in real time. If specified, you can also perform an automatic alignment based on previously measured parameters after performing an osteotomy.

mediCAD Spine® 3D optionally also suggests the optimal resection angle. Thereby, a harmonic spine profile can be automatically restored.



Automatic Measurements

On previously automatically segmented CT images, you can perform and log a multitude of common measurements automatically:

- Scoliosis by Cobb
- Scoliosis by Ferguson
- Interpedicular Distance
- Lordosis
- Kyphosis
- Intervertebral Disk Height
- Intervertebral Disk Angle
- Spondylolisthesis
- Instability by Van Akkerveeken

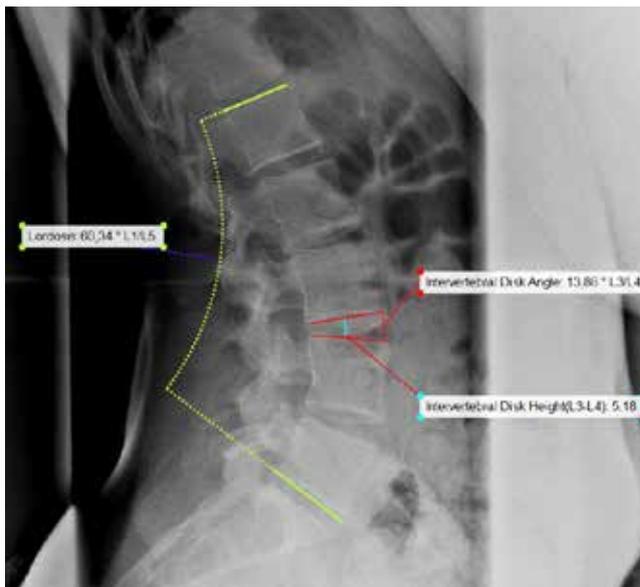
The results of the measurements are both displayed directly on the 3D Model and logged in a structured list of results. Where possible, an evaluation based on the normal values is performed and the compliance to or deviation from the normal range is displayed in a corresponding color.

This way, **mediCAD Spine® 3D** enables you to save most of the required time for these procedures. Therefore, more time is available to consult your patient and prepare any required surgery.

Medial	
Interpedicular Distance	
Description	Dimension
<input checked="" type="checkbox"/> T9	21.98 mm
<input checked="" type="checkbox"/> T10	22.62 mm
<input checked="" type="checkbox"/> T11	26.67 mm
<input checked="" type="checkbox"/> T12	28.38 mm
<input checked="" type="checkbox"/> L1	28.1 mm
<input checked="" type="checkbox"/> L2	28.03 mm
<input checked="" type="checkbox"/> L3	28.95 mm
<input checked="" type="checkbox"/> L4	32.32 mm

Classic Measurements

Besides the automatic measurements, all classic measurements can be performed manually as well. **mediCAD Spine® 3D** provides an easy and comfortable way to use the following measuring functions:



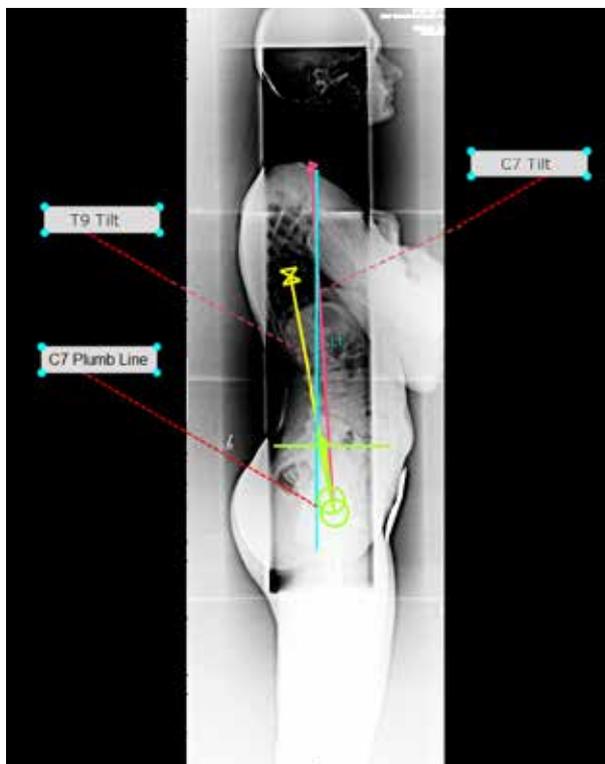
- Distance Measurement
- Angle Measurement
- Risser Grade
- Skoliosis by Cobb
- Skoliosis by Ferguson
- Interpedicular Distance
- Spinal Canal Width Index
- Spinal Canal Diameter
- Lordosis
- Kyphosis
- Atlantodental Distance
- Dens Perpendicular
- Intervertebral Disk Height
- Intervertebral Disk Angle
- Spondylolisthesis
- Instability by Van Akkerveeken
- Sacral Angles

Thanks to hybrid planning and the resulting interaction between x-ray and CT images, **mediCAD Spine® 3D** offers a significant improvement of your usual procedures – as opposed to the sagittal balance measurements usually performed on 2D images only.

Measurements taken on the 2D image can be automatically applied and therefore used as a basis for subsequent planning on the 3D model.

mediCAD Spine® 3D allows the measurement of the sagittal balance in a single function intuitively guiding the user. By placing just a few required designation points, all values are automatically calculated, drawn in and measured. The measuring results are, like with all automatic measurements, logged in a structured list of results and, when applicable, evaluated with regard to the normal values.

The following values known from spine surgery can be measured by 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

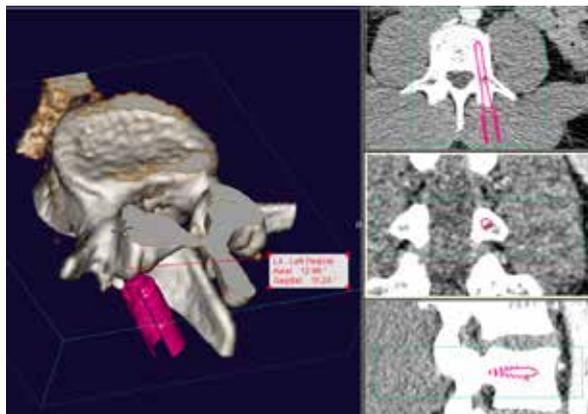
Subsequently, you can also measure and draw in the following additional values:

- T9 Tilt
- C7 Tilt
- C7 Plumb Line

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

Which screw length do I require? What is the ideal entry angle? How deep should or may the screw be drilled in? How long is the required rod and in which way does it have to be bent? And what implant is suited best for the particular spine situation?

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



The screw tool allows you to select from various screw types and lengths. On a segmented 3D model, you can additionally select the required vertebra and pedicle side. The pedicle screw is now automatically inserted into the 3D model in a standard position. You can now adjust, rotate, move or drill the screw or switch to another screw type or length entirely.

The implant tool allows you to select from various spine implants, such as cages, plates, vertebra and disk prostheses.

These can be also placed into the 3D model and further adjusted as needed. While doing so, you can use the implant tool to filter the implants based on manufacturer, type, material and size. You can also list your personal favorites only, or those used in your hospital.

In case of multiple views (e.g. 3D model and 2D slices), each adjustment is automatically displayed in all views. When working in hybrid planning mode, an automatically adjusted depiction is displayed. This allows you to try out multiple alternative versions, finding the ideal position for the individual situation of the patient and assessing it with regard to various aspects.

All selected and inserted implants are logged in the structured result list, including all relevant parameters, and can be used for further planning and pre-operative preparations.

Thanks to more than 15 years of cooperation with a great number of international spine manufacturers, **mediCAD Spine® 3D** contains the most up-to-date know how and a monthly updated and extended implant database.

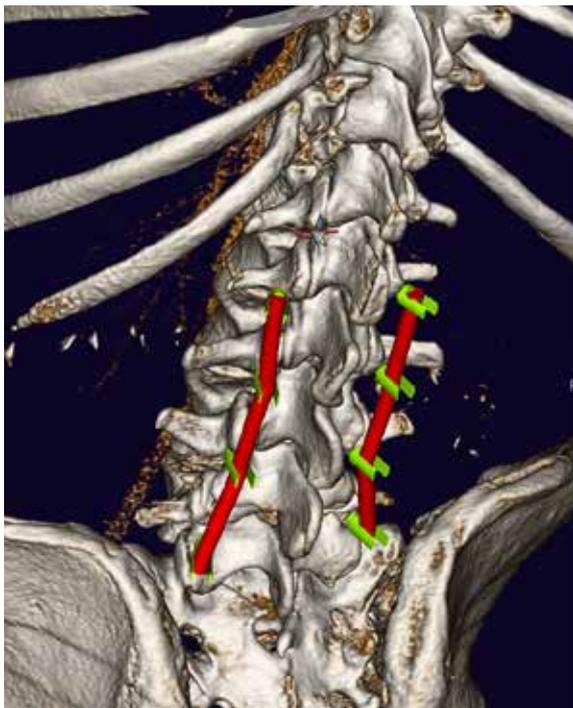
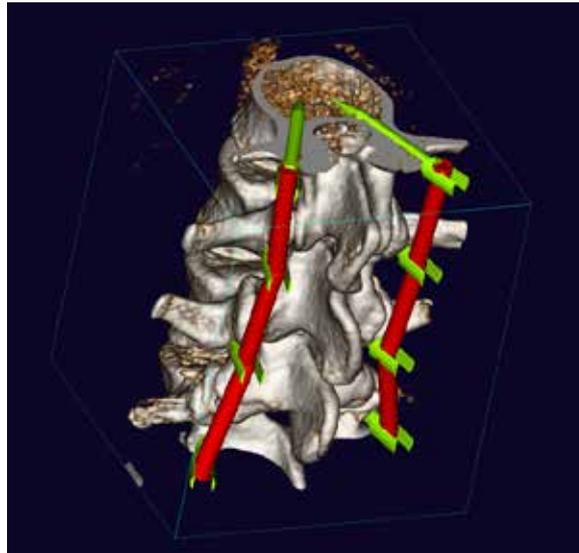


mediCAD Spine® 3D offers a convenient, innovative and easy to use solution for spondylodesis planning. You are guided by an automatic tool and – optionally with the interaction of sagittal balance and previously performed osteotomies – can simulate the restoration of a healthy patient anatomy.

After selecting all required vertebrae and pedicle sides, you can automatically insert all required screws and rods.

Within the hybrid planning mode, all results are automatically converted and displayed in the respectively other image.

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



Each recording and every planning is different and pursues a different purpose or requires another approach. It is therefore sometimes required to display the image data from a different point of view.

mediCAD Spine® 3D offers a variety of different visualization settings.

Besides the all around viewable 3D model, you can also view individual 2D slices in axial, sagittal or coronal plane. Additionally, you can display and view the 3D model in several different perspectives at the same time.

Organs and tissue can be displayed and hidden, you can view into the inside of the patient and consider the pathways of blood vessels and muscles for your planning. Surfaces can be displayed with various filters and parameters.

Individual vertebrae can be displayed or hidden. You can directly focus the view on them or display them as a clipped selection and highlight them with a color.



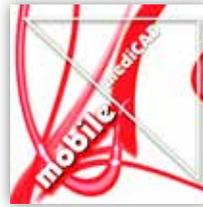
Hardware recommendations

mediCAD Spine® 3D requires Windows 7 or 8 (x64 recommended) and the .NET framework 4.5 as well as an up-to-date CPU of 4 x 2,6 GHz and a minimum of 4 GB RAM. Recommended display resolution is 1280x1024. A diagnostic monitor is not required.

Additional products by Hectec:

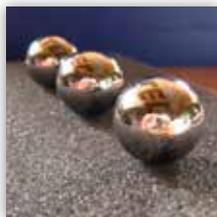


mediCAD® classic - first and most used planning software worldwide, containing many special modules (e.g. Osteotomy) and over 500.000 templates. **Also available as a Cloud solution.**



mediCAD® mobile allows surgery planning on your tablet PC, without regard to time and place. Furthermore, all patient data is always at your disposal.

Reference objects



Reference sphere Ø 25 mm

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



Table with gooseneck

Flexible arm, variable in length, on a large base plate. Integrated reference sphere.



One-way adhesive pads

Pads for easy placement of the reference sphere on the bone level of the patient.



Clamp with gooseneck

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

Training - DICOM®

mediCAD Spine® 3D requires no previous knowledge 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.

HECTEC is ready to provide skilled training for every module. Both on-site and online training are available.

Radiographs are imported in DICOM® format through an interface on your PACS/ RIS system. **mediCAD Spine® 3D** communicates with all DICOM® interfaces, making it compatible with all PACS systems. Many common image formats can also be imported.

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mediCAD Spine® 3D

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