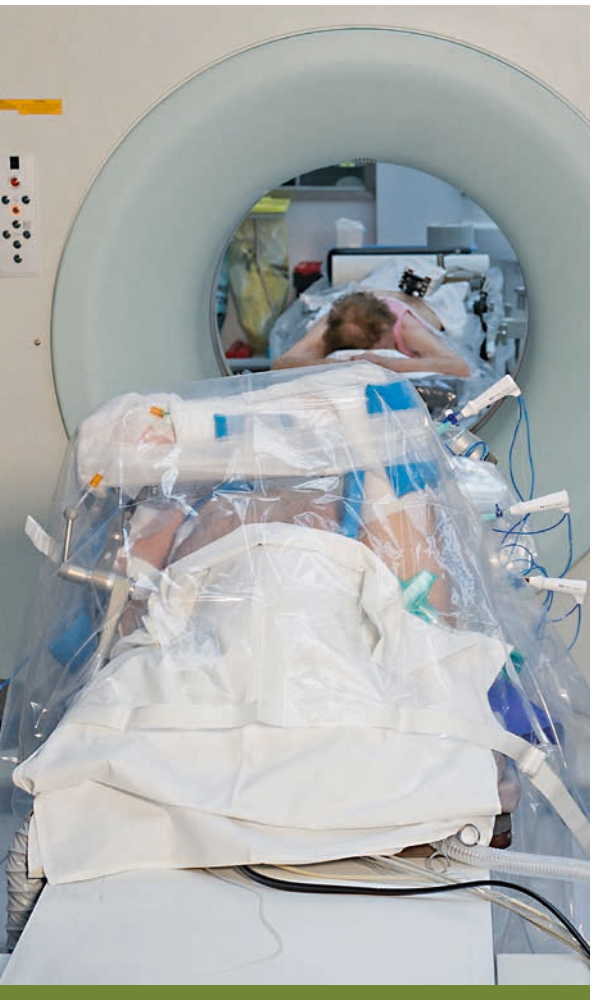
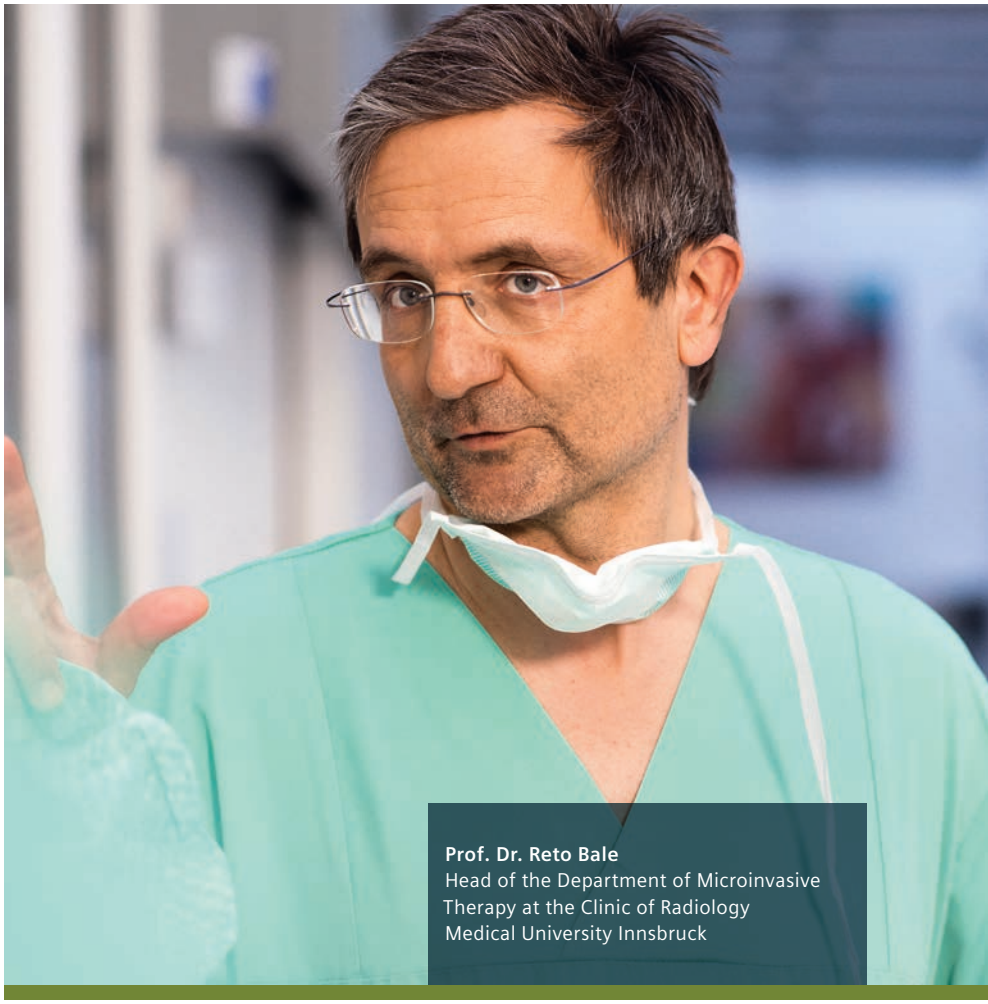
Sliding Gantry

Intraoperative computed tomography on rails

A sliding gantry solution brings CT image quality to the operating room and can optimize the cost-benefit ratio

When Siemens first introduced CT technology in the 1970s, the engineers did not even dream of putting a CT on rails for high-quality 3D imaging in the operating room. But 40 years later, an intraoperative CT scanner from Siemens has been designed with the needs of the surgeons in mind: Rather than moving the table with the patient into the CT gantry, the intraoperative CT's large gantry slides on rails over the patient on a standard surgical table.





Prof. Dr. Reto Bale
Head of the Department of Microinvasive Therapy at the Clinic of Radiology
Medical University Innsbruck

Innsbruck: Unconventional thinkers

At Innsbruck Medical University, intraoperative CT has become an essential component: The Section of Interventional Oncology (SIP) was one of the first institutions to use the sliding gantry CT regularly path planning of percutaneous image-guided treatments. The SIP is known around the world for performing complex percutaneous tumor and pain interventions. And the colleagues from the Department of Neurosurgery use intraoperative CT for trauma surgery when every minute counts.

Watch the interviews

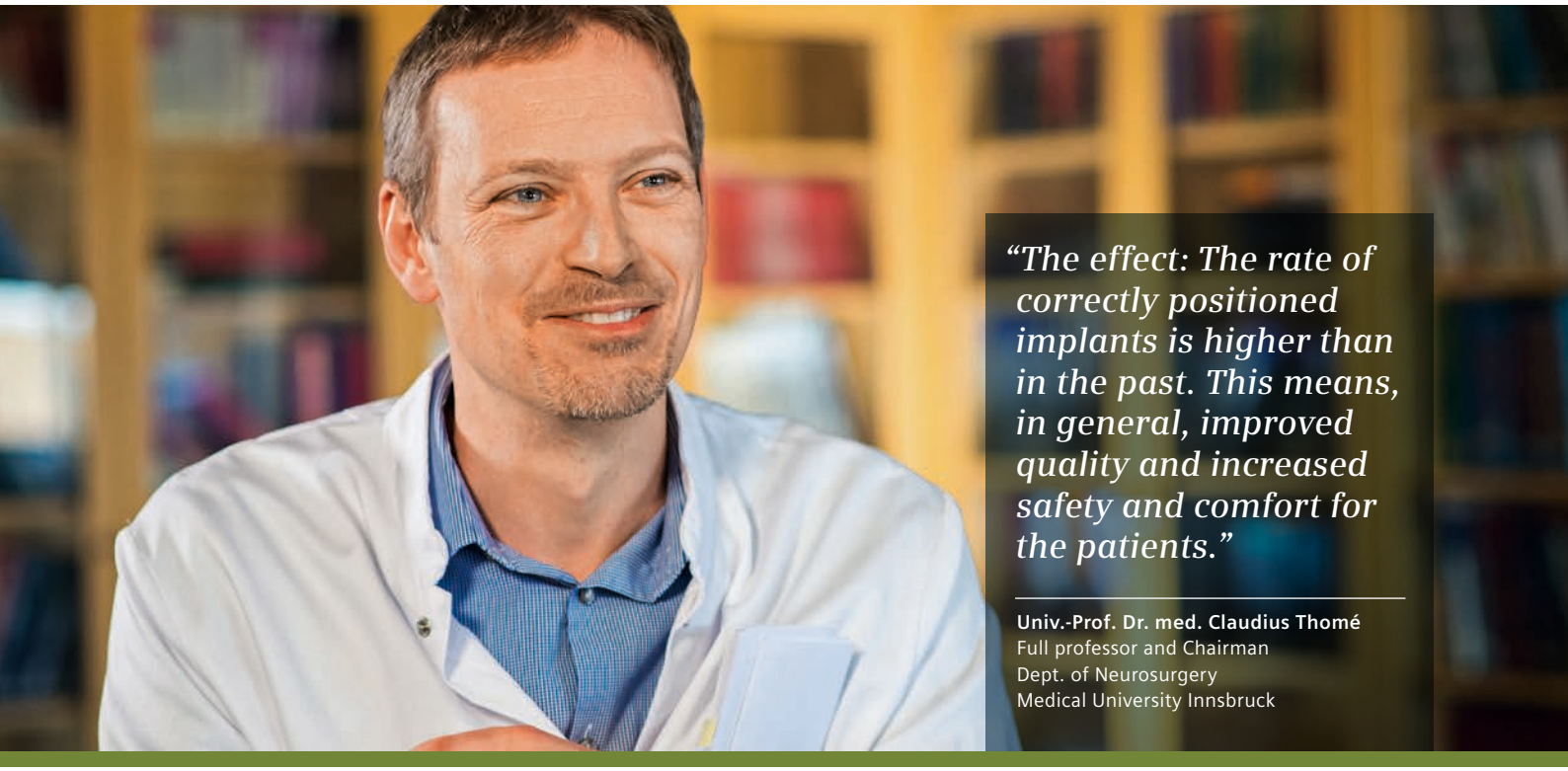
Read the QR code with the QR code reader in your mobile phone!

Reto Bale has treated more than 700 patients with liver tumors by stereotactic radiofrequency ablation.

Watch the whole interview: siemens.com/you-tube/stereotactic-radiofrequency-ablation

"We have not revised a single patient who had a CT intraoperatively" says Claudius Thomé.

Watch the whole interview: siemens.com/you-tube/intraoperative-ct



Sliding Gantry

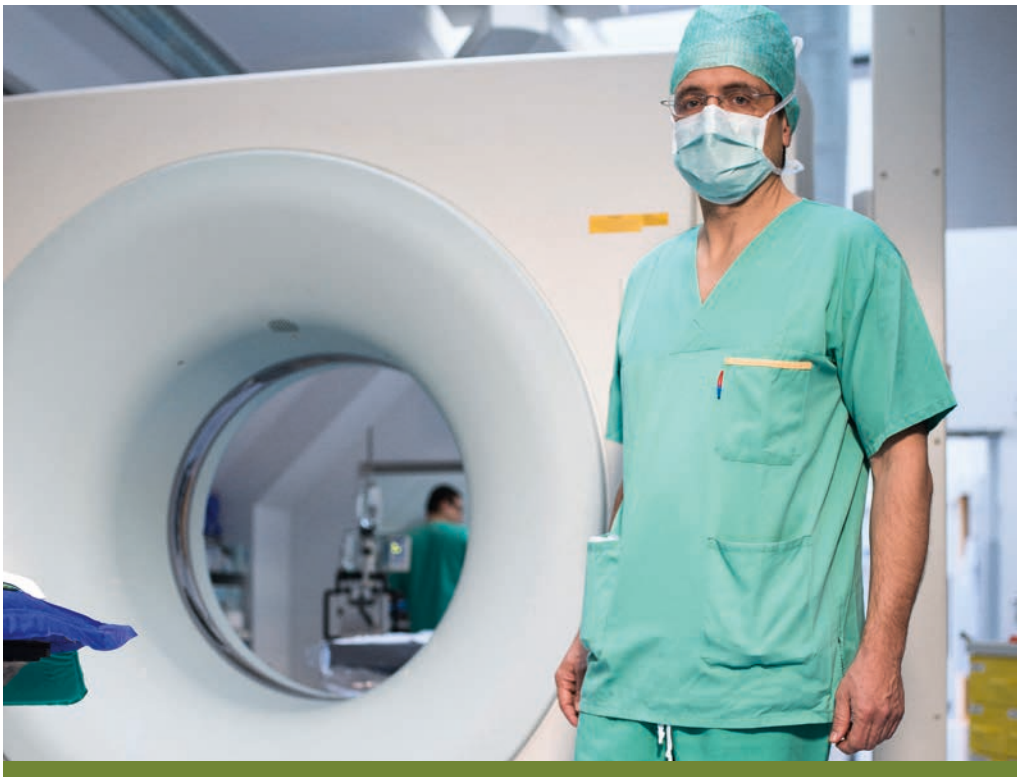
Dr. Claudius Thomé's surgical specialties are cerebrovascular surgery, skull-base surgery, and complex spine surgery. Especially for trauma patients, every minute counts. Because intraoperative CT allows him to update the dataset for the neuronavigation system whenever necessary, Dr. Thomé can spend his time focusing on the patient and not on the technology. The result is that it becomes easier to preserve delicate structures, which enables him to be more confident: *"Previously, we worked with CT images from before the operation. Now we can navigate every instrument throughout the entire operation. And if we need an intraoperative image during surgery, we do not need to move the patient – the CT moves over the operating table. This is a big advantage, particularly for trauma patients."*

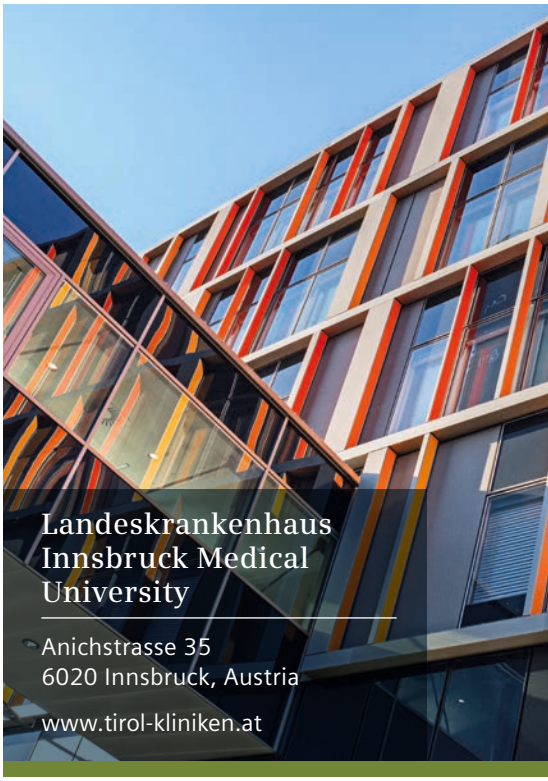
Increased accuracy

3D reconstruction based on high-resolution images from the CT are the prerequisite for modern navigation software to function. During the operation, the markings on the fixed head of the patient are the only additional thing that is necessary. Another advantage: *"You don't have to indicate the position of the patient – the CT does everything. So during the operation, I know with millimeter precision exactly where I am,"* says Dr. Thomé. *"In spinal instrumentation, for example, we see on the navigation system's monitor exactly how the instrument that is drilling the channel for the screw is entering the vertebra, and we can make corrections while we are operating. The effect: The rate of correctly positioned implants is higher than in the past. This means, in general, improved quality and increased safety and comfort for the patients. Another very important factor is that the spine surgeons in the operating room are no longer exposed to X-rays. Usually we do another CT scan in the treatment room when we are done with our work. If a screw or another implant is not in position, we can revise right then, which makes another operation unnecessary."*

> *"We have not revised a single patient who had a CT intraoperatively, because you can see whether the screws are correct or not."*

And to date, the team has not revised a single patient who had a CT intraoperatively. Because word about this high quality has gotten around, the Innsbruck team now has more referrals of patients with very complex deformaties. Dr. Thomé meets the challenges by continuously improving the workflow: *"After the learning period, we are faster than without navigation. We anticipate that, in the future, we can further reduce the time needed for screw positioning during an operation."*





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Intraoperative navigation systems may help reduce the risks

It is no surprise that Dr. Reto Bale – director of the section of microinvasive therapy in Innsbruck and one of the early adopters in integrating the sliding gantry into the treatment room – is an unconventional thinker: *"You don't need an MR gantry for MR-guided interventions – you just do it in the CT gantry by using image fusion,"* he says. In his opinion, increasing use of intraoperative navigation systems may help reduce the risks of minimally invasive surgical techniques.

Three-dimensional planning of positioning of multiple probes

Today, Dr. Bale is embarking once again on new paths using a special technology for tumor treatment through radiofrequency ablation. *"The difference between this and conventional radiofrequency ablation is that we use the 3D navigation system for three-dimensional planning of positioning of multiple probes to cover the entire tumor with overlapping ablation zones."* In order to completely cover the tumor, Dr. Bale uses the CT data three times: *"First we do a planning CT and send the data to the 3D navigation system. After we have planned all the pathways, we use the navigation system to place the needles."* With a second CT, the team checks the position of the needles with respect to their plan with image fusion. *"After ablation, we need a third contrast-enhanced CT to check if the tumor is completely covered by the ablation zone."* The result of his method speaks for itself: *"We have two to three times less morbidity and two to three times less mortality than resection, and the same local recurrence rate and similar long-term survival rates."*

Hospital portraits

The Department of Neurosurgery at Innsbruck Medical University covers general neurosurgery but has a focus on the spine (about 60 percent spine cases). In cranial cases, the Innsbruck team treats regular brain tumors, skull base tumors, and vascular cases as well as deep brain stimulation. An intensive care unit is covered by neurosurgeons.

The Department of Radiology (Director: Prof. Werner Jaschke) is at the Innsbruck Medical University. The Section of Interventional Oncology – Microinvasive Therapy (SIP) covers 3D navigated percutaneous thermal ablation of tumors in various body locations. Another important focus of the SIP is percutaneous pain treatment by infiltration and radiofrequency ablation.