# Out of the Radiation Bunker and into the Daylight

A private practice for radiation therapy in Altötting, Upper Bavaria, the most well-known place of pilgrimage in Germany and home of Pope Benedict XVI, is setting new milestones: a treatment room flooded with daylight, a small specialized team, and state-of-the-art technology that rivals any top international university.

By Hildegard Kaulen, PhD

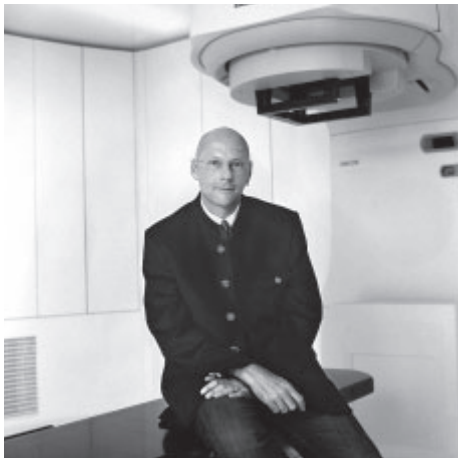
Curiosity, surprise, skepticism. Nobody enters the radiation therapy practice in Altötting without immediately recognizing what is right in front of him. It is not a dark, underground radiation bunker. Instead, it is a bright, light-flooded building with large, inviting windows. Wherever you look, it is painted a sunny yellow. Huge flowers connect the ceiling and the floor – heaven and earth. Walls slant toward visitors. Trapezoidal doors replace traditional right angles. Walls flow through the room like a gentle surf. The reception area is open, uncluttered, and friendly. There are no lines of people, just smiling faces. The dressing rooms are like curved snailshells. Along the walls, one finds small installations for the senses that want to be touched, smelled, listened to and viewed. The physician comes to see the patient, not the other way around. The radiation room itself has a large window with a view of a finely structured biosphere from moss, lichens, and tender plants. Symbols of life, beyond eternity. Colored lights line the ceiling – blue, green, red, and again yellow, the color of the sun. Every light represents another mood. Tranquility, courage, strength, and expanse. The center of the room holds the Oncor™ Linear Accelerator and the treatment table that provides a view of the plant life in front of the window.

## Architecture as a Dialog Board

This light-filled radiation room has only one role model – a comparable private practice in Passau. Both centers belong to a chain of radiological practices and radiation therapy centers in the vicinity of the two towns. The owners are ten

Yellow as far as one can see. The radiation oncology practice in Altötting captivates visitors not only by its modern design, but also by its business model and state-of-the-art technology.

Bertram Rosskopf, MD, uses the architecture as a forum for patient dialogue.



"In the treatment process, everybody concentrates on his core competence," says Gerd Schenk, PhD.

As Managing Director, Stefan Braitinger, MD, emphasizes structured processes and efficient workflows.

managing partners who started this bold and trendsetting endeavor ten years ago. Stefan Braitinger, MD, is the Managing Director, Bertram Rosskopf, MD, is the Chief Radiologist in Altötting, and Gerd Schenk, PhD, is responsible for medical physics as well as the ten-megabyte remote connection to the central database in Passau that stores every detail of information from the nine institutes. Rosskopf explains, "Behind the unusual architecture of the two radiation therapy centers is a sophisticated concept. In Passau, we were still somewhat cautious; in Altötting we are bold and radical. The architecture is our dialogue board. Everybody who comes to see us talks about it. Many are thrilled, some are skeptical, but nobody is indifferent to it." This helps physicians immediately establish a connection with patients. Initially, they only know one topic: the devastating diagnosis of cancer. But here, the architecture helps make this topic secondary. "We don't start our discussion with the tumor, the side effects, and the prognosis. Instead we talk about art, organic forms, and nature which we use as our basis. It helps the patient to free part of his mind. He stops his fixation on cancer. It uplifts his spirits. Hopefully, he can connect with his life source again, which is especially important at this stage of his illness." Rosskopf and his colleagues consider the building in Altötting created by a young architect, Albert Köberl, a piece of architecture that aids the recovery of cancer-stricken patients. They want to consciously set new standards, and not just for Upper Bavaria, but for all of Germany.

## The Patient as the Central Focus

For the ten partners, the principles realized in Altötting are trendsetting beyond question. In a nutshell, they seem to be mandatory: The patient is at the center, architecture is the dialog, and ultramodern medical technology works for state-of-the-art sciences supported by competent and reliable relationships. Braitinger explains: "Ideally, this is what medicine should be. By structuring all of our processes, by using state-of-the-art imaging and image processing systems, as well as installing a central database in Passau, which interconnects all aspects from planning to invoicing, and by seamlessly integrating all applications and work steps, we have created an unbelievably effective workflow. The results are improved efficiency in every single one of our nine facilities and in every future facility we add to our network."
Technology, workflow, and efficiency. These are the areas where Siemens came into play. To support the private practice, Siemens generated a business plan, developed scenarios for costs, sales, and results, computed the extraordinary radiation protection plans for the daylight radiation room, supplied the linear accelerator, and installed user-friendly tools. These tools, for example, *syngo*® RT Oncologist, *syngo* RT Dosimetrist and *syngo* RT Physicist, as well as the LANTIS™ Oncology Management System, provide fast access to all data for all participants, and ensure a remote connection to headquarters in Passau. Schenk adds, "Today, we have a sophisticated treatment chain where everybody focuses on his particular core competency. This allows us to work profitably in medicine, a field that is becoming increasingly restrictive, without foregoing new investments. Our newest tool is MVision™, a software package that enables us to check and adjust the location of the target volume immediately prior to radiation."
During their daily work, the ten partners rely on strong cooperation. In Altötting, the practice is directly connected to a reputable district hospital. The German Cancer Association recently certified this hospital as one of the five German colon cancer centers. While both facilities are located in close proximity to one another, they differ visually. In addition, the radiation therapy facility in Altötting works closely with other hospitals in the vicinity,

like the breast cancer center in the neighboring Eggenfelden. According to Rosskopf, "We see ourselves as a cooperation partner for hospitals and referring physicians. We are an important intersection in an area-wide care system."

## Architecture is Decided by Location

The ten partners allowed for deviation from their business model in one instance only – the actual shape of the architecture. The rooms have to surprise and distract, but also have to be well matched to the people. Not every building is suitable for every region. Despite its rural setting in Upper Bavaria, Altötting is a town where architecture can be daring. The place of pilgrimage, with its famous Black Madonna, is in the catchment area of Munich. People enjoy above-average income levels and are well-educated. They are used to bold installations beyond the deep-rooted religiousness. Braitinger says, "We had to consider these influences during our planning stage. In other regions of Germany – in economically less developed areas or in the center of a metropolis – the framework and visual impressions are different. That is why the architecture has to be different there as well." Braitinger and his colleagues do not doubt that their interpretation of a modern radiation therapy center beyond an underground bunker is not limited to just Altötting and Passau. According to them, the next facility will be completely different.

## MVision as Entry into IMRT

The private practice in Altötting presents more than revolutionary architecture. It also stands for ultramodern radiation therapy. The objective of this kind of therapy is to irradiate the tumor with great precision and to spare the surrounding tissue as much as possible. Previously, only radiation fields could be used, where the dose was homogeneously distributed across the entire cross-section of the field. For this purpose, the shape and geometry of the field were determined beforehand, and the resulting dose distribution was computed. The sparing of possible structures at risk was not always at its most optimal. However, today, it is possible to divide the therapy beamlets, which can be given a different dose and come in from a different angle. Hence, the dose can be reduced in the vicinity of a structure at risk. To avoid an underdose, the energy missing in this direction of radiation in the target volume is supplemented by other directions. Highly conformed radiation plans are implemented using this so-called Intensity-Modulated Radiation Therapy (IMRT). This method requires precise patient positioning and improved monitoring of both organ location and movement. That's where the problem lies. Irradiation is planned beforehand. The data are provided by computed tomography (CT), which selects midrange data by gating organ movement. A tumor may already shift by several centimeters due to respiratory motion. In addition, a patient may lose or gain weight during fractioned radiation therapy. This means that the exact location of the target volume and the organs at risk is variable within limits. Modern radiation therapy cannot dispense with determining and automatically correcting the location immediately before therapy.
MVision is a megavoltage cone beam imaging package from Siemens that fully meets these requirements. It is suitably compatible with all Siemens linear accelerators and does not require additional hardware. The image is generated with the megavoltage cone beam. In less than three minutes, the entire process of image acquisition, 3D reconstruction, and automatic offset calculation is performed. Looking beyond the technical necessities of a radiation therapy practice, Schenk adds, "With MVision, we are investing in an important development, namely Intensity-Modulated Radiation Therapy. You have to be able to prepare yourself today for what will happen in the future, especially when you are in private practice. The expectations brought to medicine will change completely. We want to be actively involved in shaping the future of medicine and technology, as well as the development of companies."

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Nature replaces bunker – different colors and daylight are expected to promote well-being.