

The Future of Oncology: The ARTISTE Solution

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Designed for Adaptive Radiation Therapy, the ARTISTE solution enables radiation oncologists to create treatment plans that include IGRT, conformal radiation therapy, IMRT, high-precision radiation therapy, and gated treatments.

The Future of Oncology: The ARTISTE Solution

At Baton Rouge General Medical Center's Pennington Cancer Center in Louisiana, U.S., the staff shares the belief that cutting-edge cancer care should not be limited to patients at larger hospitals and academic medical centers.

By Sameh Fahmy, MS

Pennington Cancer Center partnered with Siemens to rapidly and efficiently deliver advanced and routine radiation therapy close to home, providing a wider range of options for a larger scope of patients than ever before.

"We need to provide state-of-the-art cancer care for the people of this state so that they don't need to go elsewhere," says Director of Radiation Oncology Zack Smith, RT, MBA. "They should stay here – where their families are, where their community is, where their jobs are, and where they have all of the support mechanisms that will make their treatment easier."

To that end, the 544-bed, community-owned hospital became the first in the United States to install the Siemens ARTISTE™ integrated radiation therapy solution. By combining a range of advanced imaging options, rapid image acquisition and processing, and precise treatment delivery, the system has given the Pennington Cancer Center the flexibility to treat routine cases as well as those that require complicated treatment

plans, such as Intensity-Modulated Radiation Therapy (IMRT), while maintaining a quick and efficient workflow.

Enhanced Flexibility

Pennington Cancer Center installed ARTISTE in February of 2008. Medical Director William Russell, MD, explains that its flexibility was a key factor in their decision. The solution gives Russell and his colleagues the ability to create treatment plans that include Image-Guided Radiation Therapy (IGRT), conformal radiation therapy, IMRT, high-precision radiation therapy, and also gated treatments. "We chose ARTISTE because it gives us the full spectrum of treatment options," Russell says. "It allows us to efficiently and rapidly deliver routine radiation therapy for patients who don't require overly sophisticated plans, while also enabling us to deliver more complex treatments using the same platform."

ARTISTE is engineered specifically for Adaptive Radiation Therapy (ART), which aims to precisely deliver dose to the target while sparing surrounding healthy tissue.

Russell points out this is particularly important because the size and shape of tumors change during treatment and because tumors can shift in response to factors such as weight loss, inflammation in nearby tissues, and normal physiological functions – for example, lung tumors move as the patient breathes, and the prostate shifts in response to fullness in the bladder and rectum.

To help ensure that the treatment dose is delivered to the target and not healthy tissue, this radiation therapy solution allows physicians to image the patient just prior to treatment, verify that the patient position is correct, and adapt to any anatomical changes immediately before – or in some cases during – treatment. ARTISTE also offers the ability to incorporate the dose used for pretreatment imaging into the treatment plan so that clinicians can accurately monitor the dose delivered to the patient.

"Siemens has always been a leader in healthcare solutions, so for us, it made the most sense to stay with a company that had a proven track record in both therapy



and imaging for a combined modality machine," Russell says. "This system is the future of radiation oncology."

The ability to choose between multiple imaging options is one of the features that makes ARTISTE so unique. Russell explains that for patients with simple treatment plans, ARTISTE offers two-dimensional OPTIVUE™ portal imaging for low-dose, high-resolution image quality. In situations where additional imaging information is required, it offers its powerful and unique 3D MVision™ Megavoltage Cone Beam Imaging. MVision uses the treatment beam to provide 3D target imaging with excellent soft-tissue resolution. MVision also allows clinicians to incorporate dose distributions from cone beam imaging into patient treatment plans.

Rapid Workflow, Improved Outcomes

The images ARTISTE produces are of exceptionally high quality, while maintaining acquisition speed. "The speed with which the megavoltage cone beam image is acquired and the speed at which the software arrives at a solution for adaptive targeting is three minutes," Russell explains, "and that's very fast."

The system's rapid speed increases patient comfort by decreasing their time on the treatment table and, Russell says, can improve outcomes by minimizing the likelihood that the patient or the

target will shift while images are being acquired. Smith notes that another benefit of MVision is that it is fully integrated and therefore requires no add-on hardware. "When you bolt on accessories, you introduce the possibility of set-up errors and need extra quality assurance steps," Smith says. "Because everything is in line with MVision, what you're seeing is a Beam's-Eye-View [BEV]."

ARTISTE's In-Line™ Technology also streamlines workflow and increases patient comfort. Therapists are afforded clear access to the patient during setup, and the risk of collision between the linear accelerator and objects in the room, such as a patient's wheelchair, is minimized. "But the biggest plus for me is that when patients walk into the room, they see a sleek system that is not going to enclose them with a bunch of imaging apparatus coming out of the sides," Smith says. "It's a very unthreatening environment, and that makes the patients very relaxed and allows us to take care of them quickly."

ARTISTE includes the 160™ MLC Multi-leaf Collimator to provide highly accurate and precise field shaping. Its leaves move at four centimeters per second to quickly deliver treatment, and its low transmission and leakage minimizes dose to healthy tissue. It has a small, five-millimeter leaf thickness over the full field to improve conformity to the tumor shape.

Smith says most patients will only need a fraction of ARTISTE's capabilities, but for some patients, even a small increase in precision can result in significantly improved outcomes. He recalls one patient who was treated for a spinal metastasis in her upper thorax but suffered a recurrence several months later. The cancer came back in the same region and had started to deteriorate a vertebral body, causing pain. The spinal column had already received a near-maximum radiation dose, Smith says, and without the new technology, the sole treatment option would have been analgesics and a treatment that would only have slowed the progression temporarily.

Using MVision cone beam guidance, ARTISTE allowed the patient's physician to pursue a more aggressive treatment plan with a degree of precision that Smith describes as "almost like a surgeon's knife." He adds, "By the third treatment she was pain free, and today she's still pain free. So her outcome was better. The physician having that ability to make a difference in this patient's outcome just because of ARTISTE tells me that it's the right technology."

Another feature that increases treatment options for patients is its 550 TxT™ Treatment Table, which accommodates patients of up to 550 pounds (250 kilograms). Russell says the combination of ARTISTE and Siemens SOMATOM® Sensation Open large-bore computed

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Zack Smith, RT, MBA, Director of Radiation Oncology,
Pennington Cancer Center,
Baton Rouge General Medical Center,
Baton Rouge, LA, USA

tomography (CT) system, which Pennington Cancer Center uses for planning, gives them the ability to effectively treat obese patients, using the same table for both imaging and treatment – helping avoid shifts in patient positioning.

“It used to be that when patients weighed over 300 pounds [136 kilograms], not only could we not treat them well, but we couldn’t plan the treatment well,” he explains. “Now, with the combination of Siemens wide-bore CT scanner and

ARTISTE’s treatment table, we can offer high-quality, precise treatments to our larger patients.”

Large patients, as well as patients with tumors located off-isocenter, also benefit from MVision’s extended field-of-view (FOV) option.

Ease of Operation, Financial Rewards

Patient setup, imaging, verification, and treatment delivery are controlled via Siemens intuitive *syngo*[®] RT Therapist workspace. Adaptive Targeting™ on the software quickly and reliably registers pretreatment images with the planning CT.

syngo RT Therapist is a component of *syngo* Suite for Oncology¹, a streamlined, scalable workspace solution that provides members of the clinical team with the tools and data they need to efficiently accomplish their tasks. *syngo* Suite for Oncology also includes *syngo* RT Oncologist, *syngo* RT Physicist, and *syngo* RT Dosimetrist. Smith says that using *syngo* software across the Cancer Center creates efficiency by giving clinicians a common operating platform from which to work. “So even if I don’t operate the CT very often, I can go to it and the browsers are the same and the buttons are familiar and intuitive,” he says.

Smith says the *syngo* platform makes it easier for new users to operate ARTISTE and has simplified its integration into the Cancer Center’s entirely paperless environment. As a Siemens partner and the first ARTISTE site in the United States, Pennington Cancer Center hosts clinicians from across the nation and shares its expertise with centers that are adopting the solution.

Russell and Smith say that as a community-owned hospital, Baton Rouge General has a duty to be a good financial steward. The addition of ARTISTE accomplishes this goal, they say, by providing measurable financial benefits. Smith says its rapid

Treating Challenging Cases in Europe

In Europe, MAASTRO Clinic in the Netherlands and the German Cancer Research Center (DKFZ) in Heidelberg were the first to install ARTISTE. Clinicians at both centers say its flexibility has allowed them to confidently treat a number of challenging cases.

ARTISTE was used at DKFZ, for example, to treat an inoperable esophagus tumor. “Treatment for this type of tumor demands a very complicated radiotherapy approach,” says Professor Peter Huber, MD, Head of the Radiation Oncology Clinical Cooperation Unit at DKFZ. “Using the ARTISTE 160 MLC Multileaf Collimator, we were able to significantly improve the precision of the dose delivery while protecting immediate surrounding healthy tissue.”

MAASTRO Clinic has treated challenging clinical cases such as a metastasized tumor in the abdominal region and a patient with two separate metastases: one in the head and neck region, and one in the knee cap. “ARTISTE’s imaging flexibility and simplified workflow help us to confidently treat proliferated tumors in a wide range of areas of the body,” says Bas Nijsten, MSc, Medical Physicist in the Maastricht Radiation Oncology Department. “The advanced, high-end imaging capabilities of ARTISTE allow us to fully integrate all our Image-Guided Radiation Therapy and MAASTRO-developed Dose-Guided Radiation Therapy methods in one clinical workflow.”

¹ The COHERENCE Suite of Oncology workspaces is currently being rebranded to *syngo* Suite for Oncology. The mentioned workspaces are available for purchase under the COHERENCE brand name.

Summary

Challenge:

- Maintaining rapid workflow while delivering increasingly complex radiation therapy treatments
- Achieving high image quality in challenging situations
- Treating irregular tumors and tumors near critical structures
- Effectively imaging and treating obese patients

Solution:

- Expanded treatment options with the ARTISTE integrated imaging and radiation therapy solution
- Rapid image acquisition and Adaptive Targeting help ensure that treatment begins within three minutes after positioning
- MVision Megavoltage Cone Beam Imaging delivers exceptional 3D soft-tissue resolution with extended field of view
- In-room CTVision allows direct comparison of daily patient anatomy with planning data
- Fine-leaf resolution of 160 MLC allows exceptional large-field conformity and minimal dose to organs at risk
- 550TxT Treatment Table accommodates patients up to 550 pounds (250 kilograms)

Result:

- Flexibility helps ensure that all patients receive the treatment best suited to their needs
- Precise treatment delivery maximizes dose to target while minimizing dose to healthy tissue, improving patient outcomes
- Rapid image acquisition and treatment delivery enhance workflow and allow clinicians to treat more patients, increasing financial rewards

“This system is the future of radiation oncology.”

William Russell, MD,
Medical Director,
Pennington Cancer Center,
Baton Rouge General Medical
Center, Baton Rouge, LA, USA



throughput – even complex treatments such as IMRT can be accomplished in ten minutes – allows them to treat more patients in a day.

“If you have 35 patients undergoing treatment and you shave off 120 seconds from each patient, that’s more than an hour saved every day,” Smith says. “From an administrator’s perspective, that means we can treat four or five more patients in the same amount of time.” He adds that having a single system that can accomplish multiple tasks reduces staff training costs as well as engineering, maintenance, and vault costs.

Russell points out that the installation of a technologically advanced linear accelerator is tangible evidence for the general public and physicians that Pennington Cancer Center is committed to excellence. “Physicians know that we have the ability to deliver highly sophisticated treatment plans with a state-of-the-art Siemens solution,” Russell says, “and that has certainly resulted in more patient referrals to this facility.” Smith says he is confident that ARTISTE will retain its value over time because it is a

platform for which Siemens is continuing to develop technology. Upgrades currently available include diagnostic CT imaging in the treatment room with the CTVision™ solution. Smith also anticipates future advances such as kVision™ Kilovoltage Cone Beam Imaging², which delivers excellent 3D soft-tissue contrast, particularly for pelvic and thoracic targeting, and Dose-Guided Radiation Therapy (DGRT)™ Solution². “ARTISTE is cutting edge now and it’ll still be cutting edge next year, the year after that, and for years to come,” Smith says.

² kVision Kilovoltage Cone Beam Imaging and DGRT Solution are works in progress and are not commercially available in the U.S.

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