

Noninvasive Stereotactic Partial
Breast Irradiation (S-PBI) for
Breast Cancer

Stereotactic Partial Breast Irradiation (S-PBI)

Noninvasive Breast Immobilization and Prone Positioning

Breast cancer patients typically account for 25% or more of patient volumes in today's radiation oncology clinics.¹

Xcision Medical Systems has developed GammaPod™, an optimized solution for ultra-accelerated stereotactic partial breast irradiation in the prone position. The technology has been designed to overcome the challenges of current techniques and improve the treatment experience for patients.

The delivery of higher doses of conformal radiation with sharp falloff, in one or several large fractions, differentiates stereotactic radiotherapy from conventional techniques.

POTENTIAL BENEFITS



QUALITY

- Minimizing dose to the whole breast volume, heart and lungs
- Confidence in targeting accuracy



COMFORT

- Noninvasive



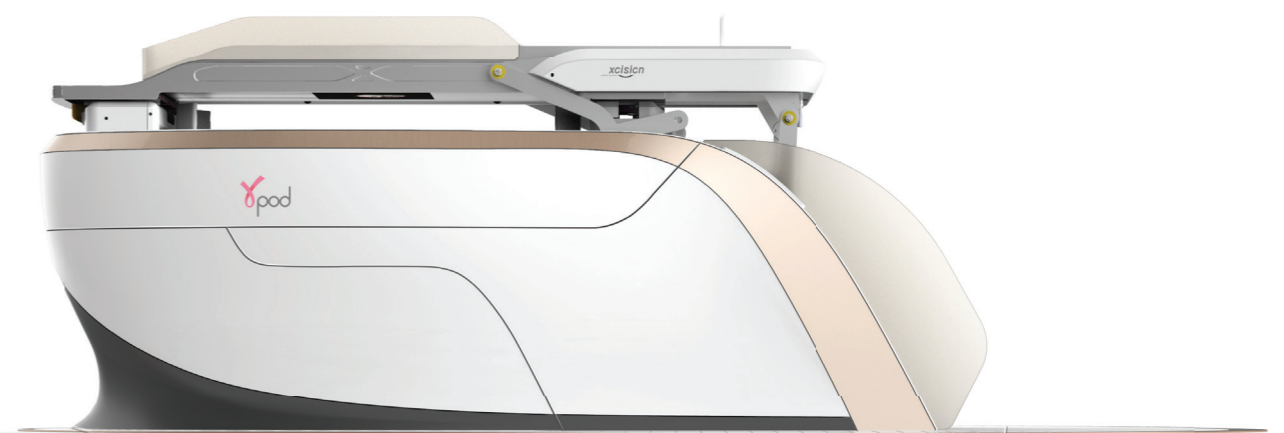
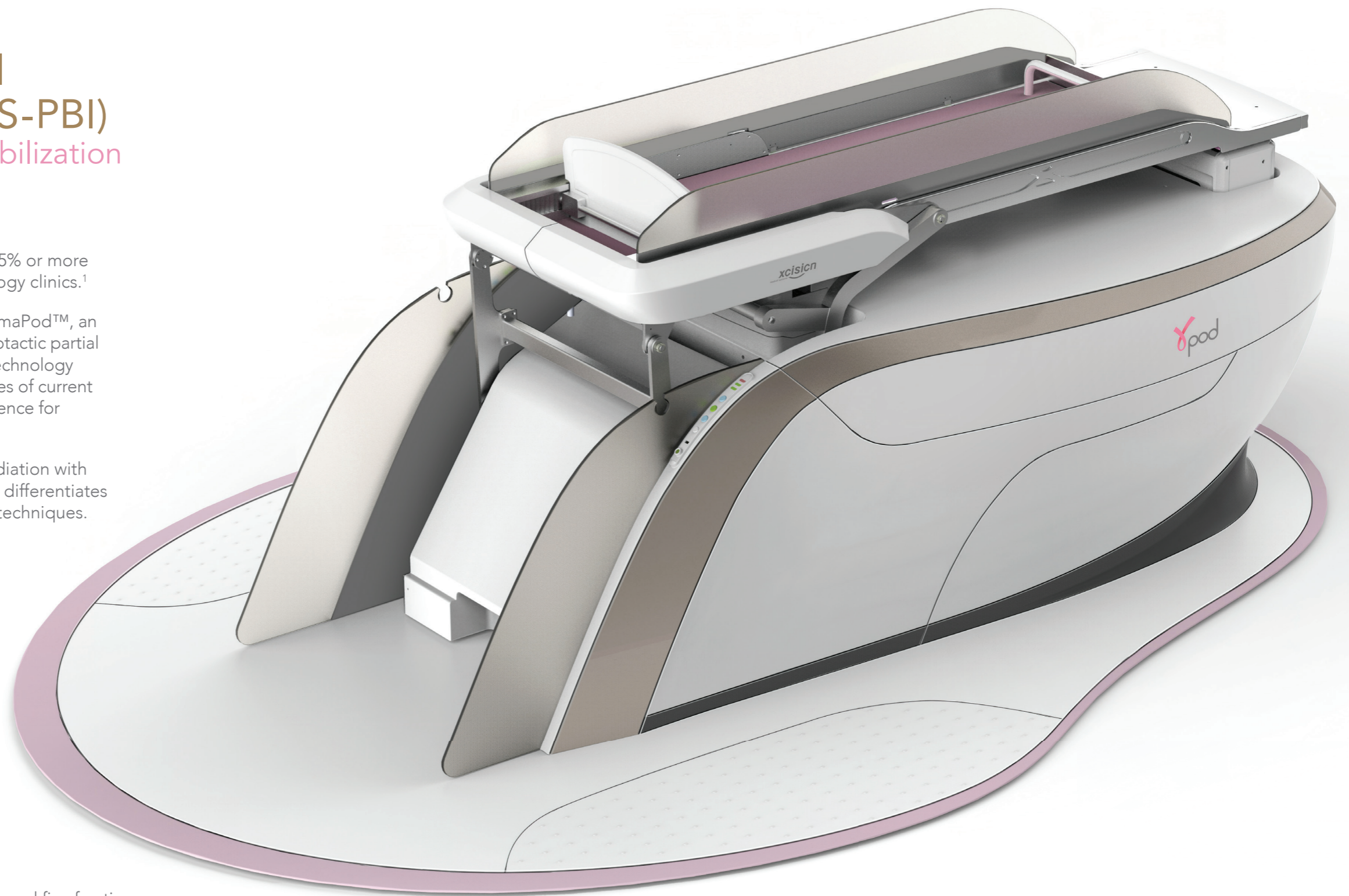
EFFICIENCY

- Shortening treatment to between one and five fractions
- Improving patient throughput, immobilization, and treatment
- Automated prone positioning



CONVENIENCE

- Fewer visits to the clinic
- Once daily treatments



¹ Xcision research estimates.

Creating New Possibilities for Breast Cancer Treatment

Born out of the vision to extend the dosimetric benefits of stereotactic radiotherapy to patients undergoing breast conserving treatment, GammaPod is a new precision tool with the potential to change the way early stage breast cancer is managed.

The ability to safely and confidently deliver a focal dose of radiation to a target within the breast is giving clinicians the opportunity to take breast radiotherapy to new levels.

With GammaPod, radiation oncologists have a new tool for delivering ultra-accelerated courses of adjuvant stereotactic partial breast irradiation, reducing tumor bed boosts to a single fraction for patients receiving whole breast irradiation and neoadjuvant treatments at ablative dose levels.

GammaPod focuses radiation to a single spot by continuously rotating 25 radiation beams collimated with 15mm and 25mm collimators. This focal spot is used to dynamically paint a uniform dose by moving the patient couch continuously following an inverse planned optimal path during treatment.

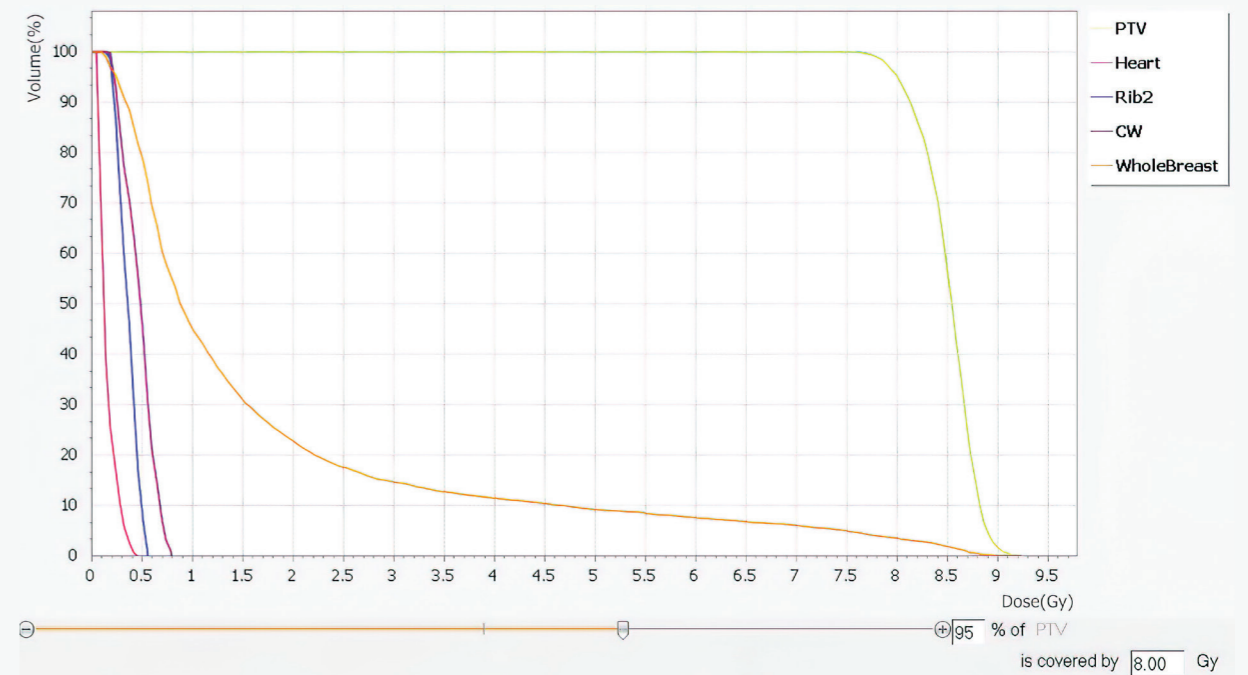


The GammaPod Difference

A highly conformal dose distribution with sharp falloff.

- Uniform target coverage
- Low doses to the whole breast volume
- Low heart doses, even with minimal distance from the target

It's a difference you can see.

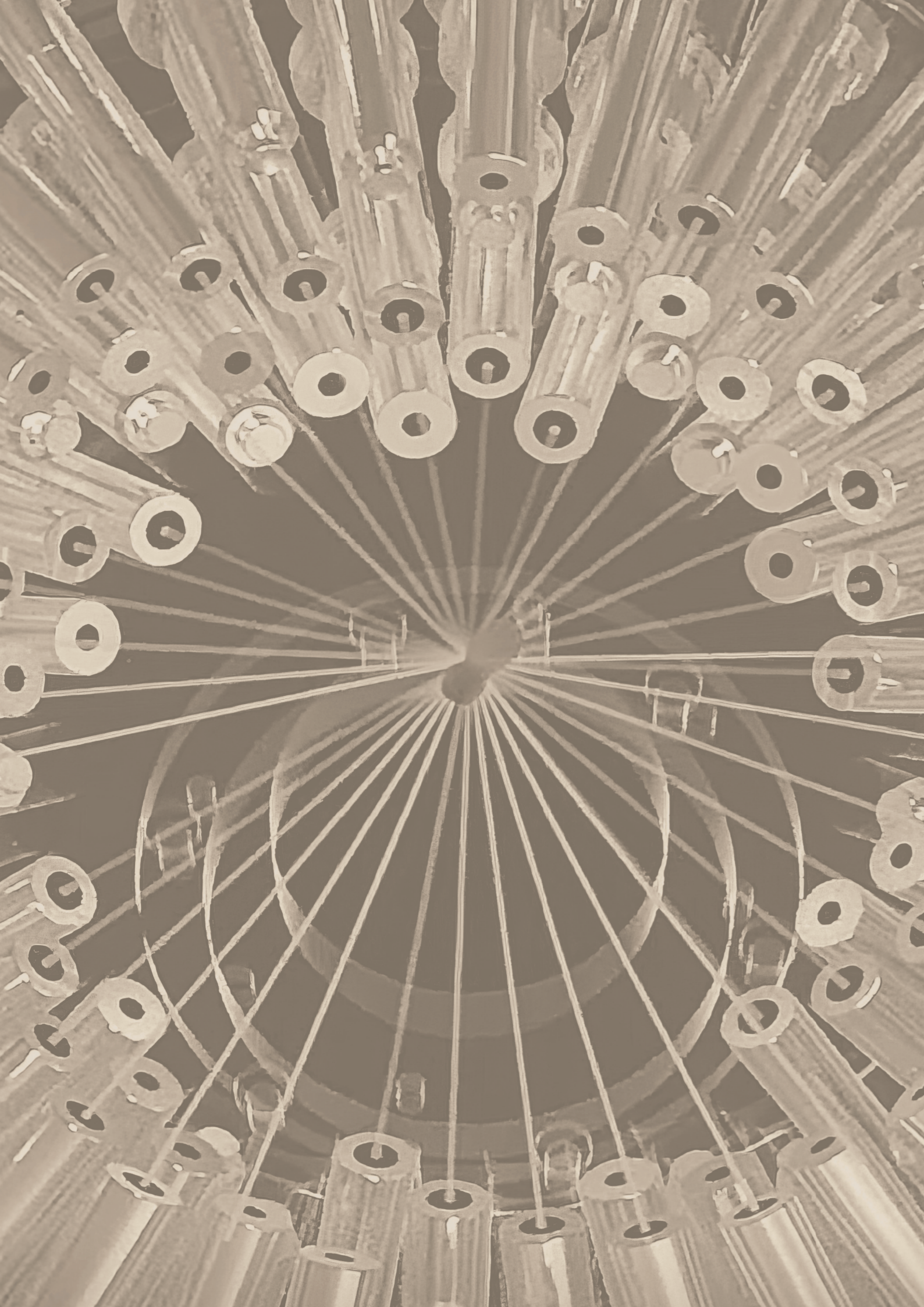


40 Gy (8 Gy x 5 fractions)
Dosimetric Example -
Left Sided Case - Fraction 1

PTV: 53.37 cc
Rx: 8 Gy to
95% of PTV

Heart
V5: 0.6%
Dmean: 11 cGy

Chest Wall
Dmax: 64 cGy
Rib Dmax: 41 cGy



Dynamic Dose Painting

With GammaPod, radiation beams rotate continuously focusing beams from thousands of directions. The treatment couch also moves continuously during treatment. As a result, the focal spot scans through the target volume along a travel path optimized with inverse planning and paints the dose to the target.

The resulting dose distributions are highly uniform (95% isodose coverage of the target volume) with sharp dose fall off.

Treating patients in the prone position naturally pulls the target away from the heart, lungs and left anterior descending artery (LAD) for dose sparing.² Prone setup has also been proven to minimize the effect of breathing motion.

To optimize the setup process, the GammaPod system includes patient loading systems in the imaging and treatment rooms for consistent setup geometry.

The patient steps on to the loaders while wearing the breast cup, which fits through an aperture and is docked to the patient couch. The loaders gently rotate patient and couch from the standing to prone position.



CONTINUOUS BEAM ROTATION



PATIENT IMAGER LOADER (STANDING POSITION) FOR CT IMAGING

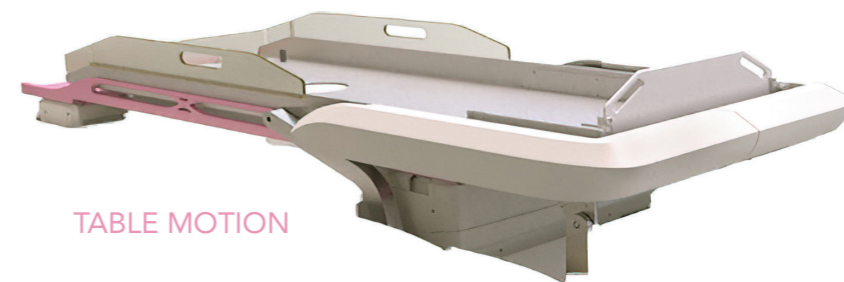
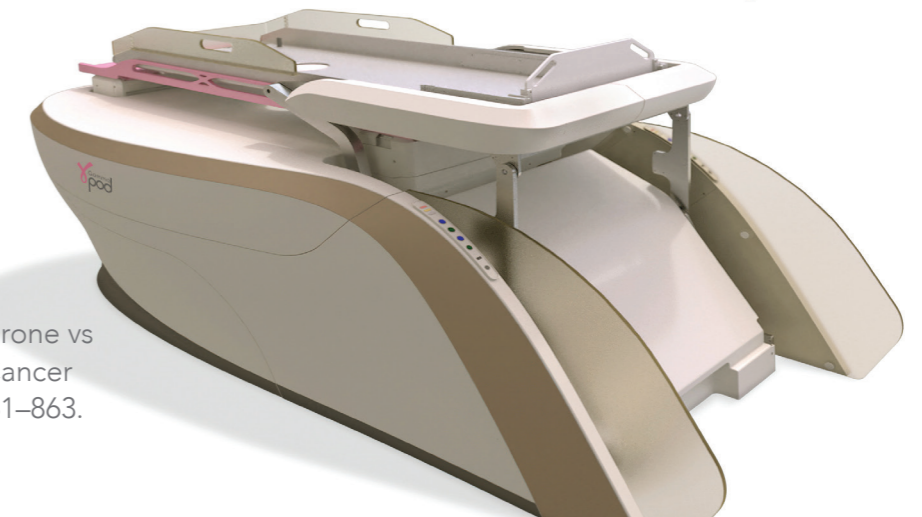


TABLE MOTION

PATIENT TREATMENT LOADER (PRONE POSITION)



² Formenti, S. C., et al. (2012). Prone vs Supine Positioning for Breast Cancer Radiotherapy. JAMA, 308(9), 861–863.

First-of-its-Kind Noninvasive Stereotactic Frame for Breast Immobilization

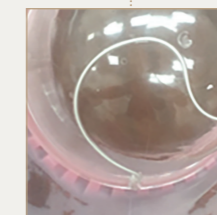
The GammaPod breast cup system provides secure immobilization of the affected breast and ensures setup reproducibility of the patient between imaging and treatment. The two-cup design creates a vacuum seal. A suction pump enables air from between the cups to be evacuated, immobilizing the breast. The fiducial wire embedded in the outer cup allows stereotactic localization of the breast tissue in the GammaPod coordinate system.



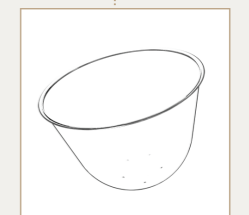
SILICONE FLANGE
Adheres the breast cup system non-invasively to the patient's chest while joining the inner and outer cups



OUTER CUP
Rigid construction to minimize breast motion when the cup is docked to the imaging and treatment tables



FIDUCIAL WIRE
Embedded in the outer cup, used to place the breast image in the 3D stereotactic coordinate system of the GammaPod



INNER CUP
The affected breast conforms to the shape of the inner cup when air is evacuated from between the cups for vacuum-assisted immobilization

Daily Imaging and Adaptive Planning



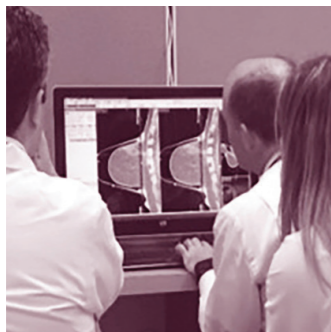
IMMOBILIZE

- Measure breast and custom-fit inner breast cup to ensure optimal fit
- Overlay the inner cup with outer cup containing embedded stereotactic fiducial markers used for localization
- Activate suction pump to create a mild negative pressure that eliminates breast motion throughout simulation and treatment delivery



SCAN

- Breast cup locked to imaging couch while patient stands on the imaging loader
- Imager loader lifts, rotates patient from standing position to prone position and transfers patient couch to the CT table
- CT simulation performed and image set transferred via DICOM to GammaPod Treatment Planning System (TPS)



PLAN

- TPS uses the embedded fiducial in the outer breast cup to register the images in the stereotactic coordinate system
- Clinician contours the GTV and critical structures, enters the prescription
- TPS optimizes the travel path of the table for coverage with high conformity and normal tissue sparing
- Resulting plan is approved for delivery



TREAT

- Patient selected at treatment console and plan reviewed
- Breast cup locks to treatment couch while patient stands on treatment loader
- Treatment loader lifts, rotates patient to prone position over the GammaPod
- GammaPod treatment delivered

Rethinking “Value” In Breast Radiotherapy Providers and Patients

GammaPod aligns with the goals of today's initiatives to transform the healthcare system. Consider the impact that the shift to GammaPod stereotactic radiotherapy could make in meeting the needs for high-quality, cost-effective and patient friendly breast cancer care. The shift to noninvasive external beam treatments with highly conformal dose distributions delivered in less time has the potential to drive value for all stakeholders.

When patients ask for the latest in treatment technology, will your program be ready?

More women are diagnosed with breast cancer each year than any other tumor site. Isn't it time to treat these patients with a noninvasive, external beam radiotherapy system that is optimized for breast treatments?

Precision stereotactic partial breast irradiation delivered in short courses has the potential to offer patients treatments that are completely noninvasive, delivered in fewer sessions and enable the return to daily life more quickly following radiotherapy.

GammaPod was designed with patient comfort and convenience in mind. Today's patients increasingly self-educate about the newest cancer treatment options. In today's hypercompetitive marketplace, consider how GammaPod could help differentiate your cancer program.



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*as of September 2023, check xcision.com for updates



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