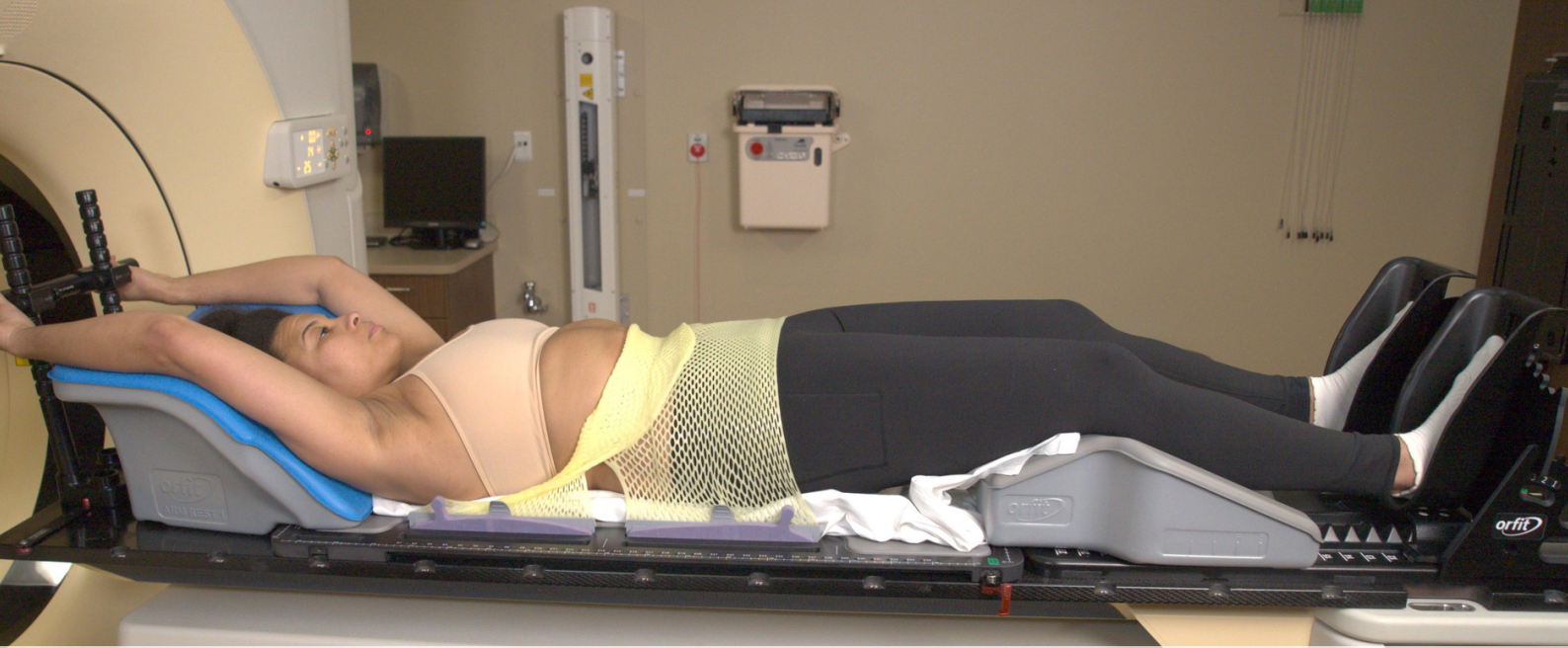




## Clinical Review: Improved Respiratory Motion Management in SBRT with The AIO Solution 3.0

**AdventHealth Colorado uses The AIO Solution 3.0 to combine immobilization and abdominal compression in a single, reproducible setup for SBRT. This technique improves 4DCT quality, reduces treatment time, and enhances alignment – including patients who can't tolerate DIBH.**

### Introduction

Respiratory motion remains a persistent challenge in stereotactic body radiation therapy (SBRT), especially when targeting tumors near the diaphragm. Traditional abdominal compression methods often introduce variability, discomfort, or inefficiencies in treatment workflows. In response, AdventHealth Colorado has developed a **novel abdominal compression masking technique using Orfit's AIO Solution 3.0**, offering a reproducible, patient-friendly, and clinically effective approach for motion management.

AdventHealth Rocky Mountain Region operates with a standardized ecosystem featuring SGRT (Surface Guided Radiation Therapy) and Orfit's All-In-One immobilization system across all sites. This environment supports high-conformity treatments without reliance on tattoos or external compression paddles, streamlining workflows and improving the patient experience.

### The Challenge

Conventional abdominal compression approaches—ranging from belts to bridge-and-paddle systems—often result in setup inconsistencies, limited reproducibility, and increased collision risks. Patients may also experience discomfort, especially with central or rigid compression, leading to potential motion during treatment. Furthermore, many of these systems are incompatible with non-coplanar treatment arcs due to added bulk around the patient.

### The Solution: Compression Masking Technique

The AdventHealth team adapted Orfit's thermoplastic mask system to deliver gentle, reproducible abdominal compression. The approach integrates compression and immobilization into a single device, eliminating the need for separate compression systems.

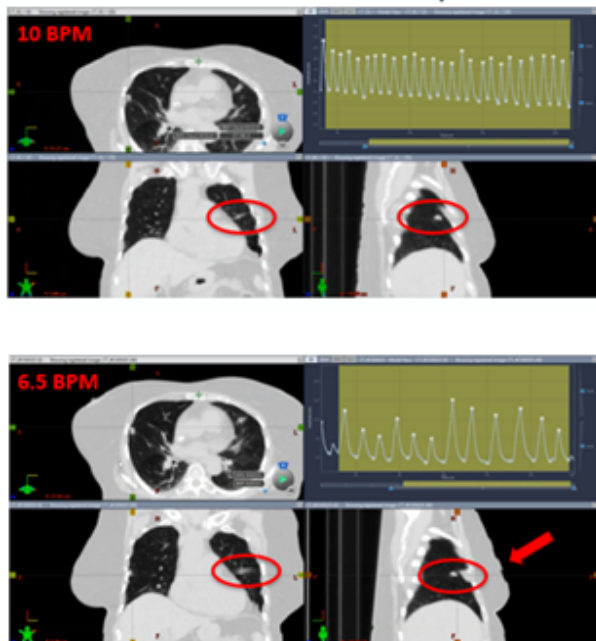
#### Key components:

- **Patient Assessment and Preparation:** Evaluate breathing patterns, body habitus, and identify anatomical landmarks (e.g., base of ribs).
- **Mask Selection and Fabrication:**
  - A warmed thermoplastic mask is stretched and shaped over the patient during an exhalation breath hold.
  - Cold, wet towels are applied over the mask to create uniform pressure during curing.
  - The mask is then cooled, hardened, and reapplied in a controlled manner for simulation.
- **Treatment Planning Considerations:**
  - SGRT is used for both setup and motion tracking, eliminating the need for tattoos or RPM markers.
  - The compression mask significantly reduces artifacts in 4DCT, improving tumor visibility and reducing uncertainty in target volume.
  - By conforming tightly to patient anatomy, the system minimizes collision risks and allows broader use of non-coplanar beams.

## Clinical Impact

Case studies demonstrate the clinical value:

- In one patient who failed DIBH setup, the compression mask enabled high-quality 4DCT acquisition at 10 BPM (vs. 6.5 BPM prior), eliminating artifacts and reducing planning volume.
- Treatment time was significantly reduced, with total beam-on times of just 2-3 minutes and full treatment completed in about 8 minutes per session.



## Advantages

- **Efficiency:** 20-30 minute simulation process with minimal need for rework or reimaging.
- **Reproducibility:** Consistent application technique leads to tight internal anatomy alignment.
- **Flexibility:** Suitable for various tumor sites (lung, liver, pancreas) and body types..
- **Improved Patient Comfort:** Avoids painful localized pressure; setup remains tolerable even for frail or elderly patients.
- **Compatibility with SGRT and Non-Coplanar Arcs:** Enables high-quality treatment delivery without compromising planning geometry.

## Considerations for Implementation

- **Training:** Proper technique is essential. Mask stretch should be uniform, and therapist coordination is key.
- **Patient Education:** Clear communication improves compliance and setup accuracy.
- **Body Habitus Limitations:** Larger patients may present challenges; adaptation or alternative approaches may be needed.
- **Mask Cooling:** Fully curing and cooling the mask prior to simulation is critical to ensure reproducibility.

## Conclusion

The compression masking technique represents a practical, scalable, and highly effective solution to respiratory motion management in SBRT. By integrating compression into the immobilization process, clinics can reduce complexity, enhance treatment precision, and improve patient experience – all without sacrificing clinical outcomes.

## About the Author

**Mike Tallhamer** is the Chief of Radiation Physics at AdventHealth's Rocky Mountain Region. With more than 20 years of experience in radiation oncology, his work focuses on advancing practical, reproducible techniques for high-quality cancer treatment.



## About Orfit

Orfit brings high precision and comfort to the positioning and immobilization of cancer patients through a complete family of Orfit systems for brain, head and neck, supine and prone breast treatment, pelvis and abdomen treatment, SRS, SBRT, extremities, pediatric, MR, brachytherapy, and proton therapy.

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**ORFIT INDUSTRIES**  
Vosveld 9A  
B-2110 Wijnegem | Belgium  
T (+32) (0)3 326 20 26  
[welcome@orfit.com](mailto:welcome@orfit.com)

**ORFIT INDUSTRIES AMERICA**  
810 Ford Drive | Norfolk  
Virginia 23523 | USA  
T 516-935-8500  
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