



# Using Postural Video to Reduce Positioning Errors

*Carmen E. Parsels BS, R.T. (R)(T)*  
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Creating a Cancer-free World.  
One Person, One Discovery at a Time.

The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute



I have no conflict of interest to  
disclose in regard to this  
presentation.

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In 2011 the Stefanie Spielman Comprehensive Breast Center opened. It is the first of its kind in the Midwest to offer the full continuum of breast cancer care, from prevention and screening through detection, diagnosis and treatment.

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# Supine Breast Cancer Treatment

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## Challenges of Supine Breast Treatment

- Reproducibility of large/pendulous breast
- Skinfolds leading to skin reaction and poor cosmetic outcomes
- Arm and wrist cups are not fixed
- Shoulders may relax between CTSim and Treatment, especially mastectomy patients
- DIBH technique

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# OSU Breast Center Imaging Policy

- Imaging for 3D conformal plans:
- Planar Imaging
  - Type: Film orthogonal pair, one regional nodal field, and one large angled treatment field, alternating medial and lateral
  - Frequency: Days 1-3, if all moves are 3mm or less, then resume filming per standard frequency (weekly)
  - Repeat imaging next day if shift is greater than 3mm

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# OSU Breast Center Imaging Policy

- Imaging for IMRT/VMAT plans:
- Planar Imaging
  - Type: CBCT, orthogonal pair
  - Frequency: CBCT and orthogonal pair Days 1-3. Resume with daily orthogonal pair and weekly CBCT if all CBCT shifts < 3mm. Resume with daily CBCT and weekly orthogs if all CBCT shifts > 3mm

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# Equipment Used



- Civco breast board
- Civco chin mask
- Civco vacbag



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# vision $\oplus$ rt

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# AlignRT



AlignRT is a 3D stereo camera system that tracks a patient's position before and during radiation therapy, to aid in setup and treatment accuracy.

-VisionRT

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# Postural Video

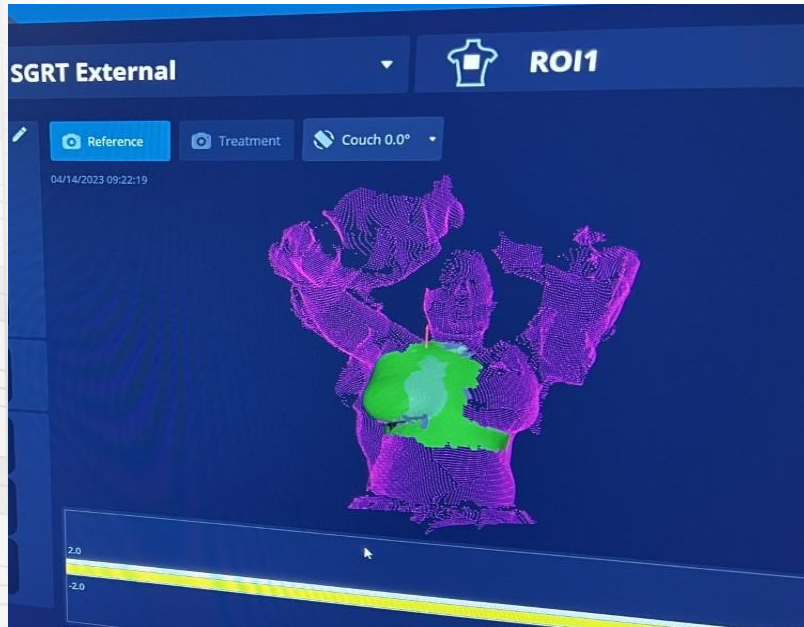


The Postural Video™ module gives you a multi-angle, real-time view of the patient's overall alignment relative to their reference position during setup and monitoring by using an outline of the reference surface and a live video stream of the patient.

-VisionRT

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# AlignRT Surface Versus Postural Video



Region of Interest in green drawn by therapist in Align RT

VS



Pink contours on body displayed by Postural Video

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# Postural Video Study

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# Focus and Goal of Study

- **Focus:**

- Reproducibility of arm, shoulder and hip positioning for daily supine treatments
- Using Postural Video to aid in final adjustments before imaging

- **Goals:**

- Decrease repeat imaging
- Decrease overall treatment time
- Decrease patient exposure
- Increase workflow efficiency by creating fewer images to review

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# Imaging Dose

- Imaging dose from a kV planar image is ~1-3 mGy
  - AAPM TG-75
- Imaging dose from 6MV portal image pair is ~1-5 cGy
  - AAPM TG-180
- Imaging dose from CBCT is ~1-9 cGy
  - AAPM TG-180

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# Daily Treatment Workflow

## Traditional Workflow

- Patients aligned using breast board number, tattoos and lasers
- Calculated shifts are made from tattoos to isocenter daily
- Shift table to match AlignRT Surface (department policy of no more than 3mm)

## Study Workflow

- Patients aligned using breast board number, tattoos and lasers
- Calculated shifts are made from tattoos to isocenter daily
- Shift table, and adjust patient's shoulder/arm and hip to match Postural Video

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# Adjusting to Postural Video



Before adjusting elbow

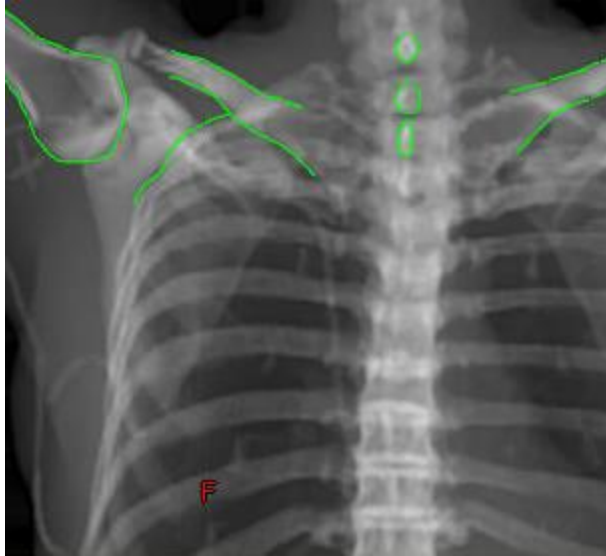


After Adjustment

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# Have vs Need

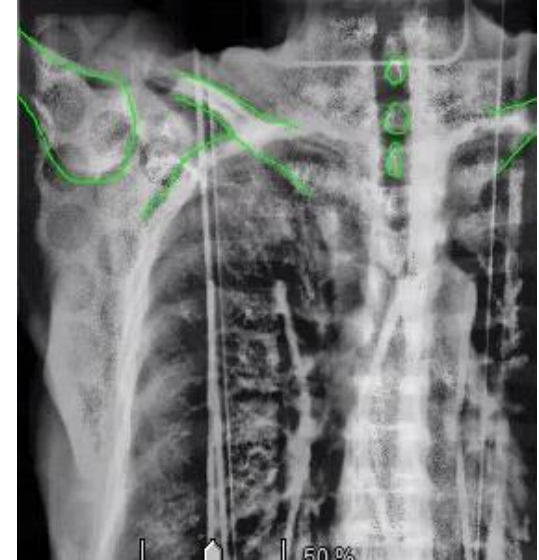
**Alignment goal  
DRR from Tx plan**



**Image without using  
Postural Video**



**Image using  
Postural Video**



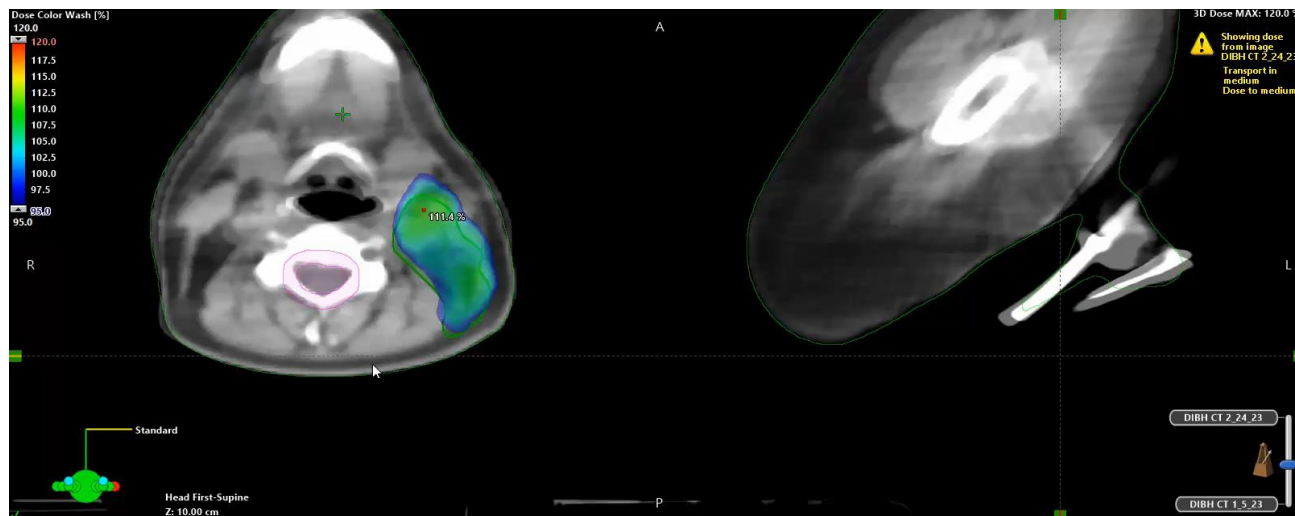
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# Dosimetric Impact of Incorrect Arm Positioning

Example: Left sided Postmastectomy\_Regional Nodal patient treated DIBH with VMAT technique. The patient had a Re CT and was replanned due to lack of shoulder reproducibility.

*This video is a blended Axial view of Initial plan and Replan with 95% Isodose line on*

*Focus attention on left humeral head/scapula misalignment and lack of coverage to Sclav volume*

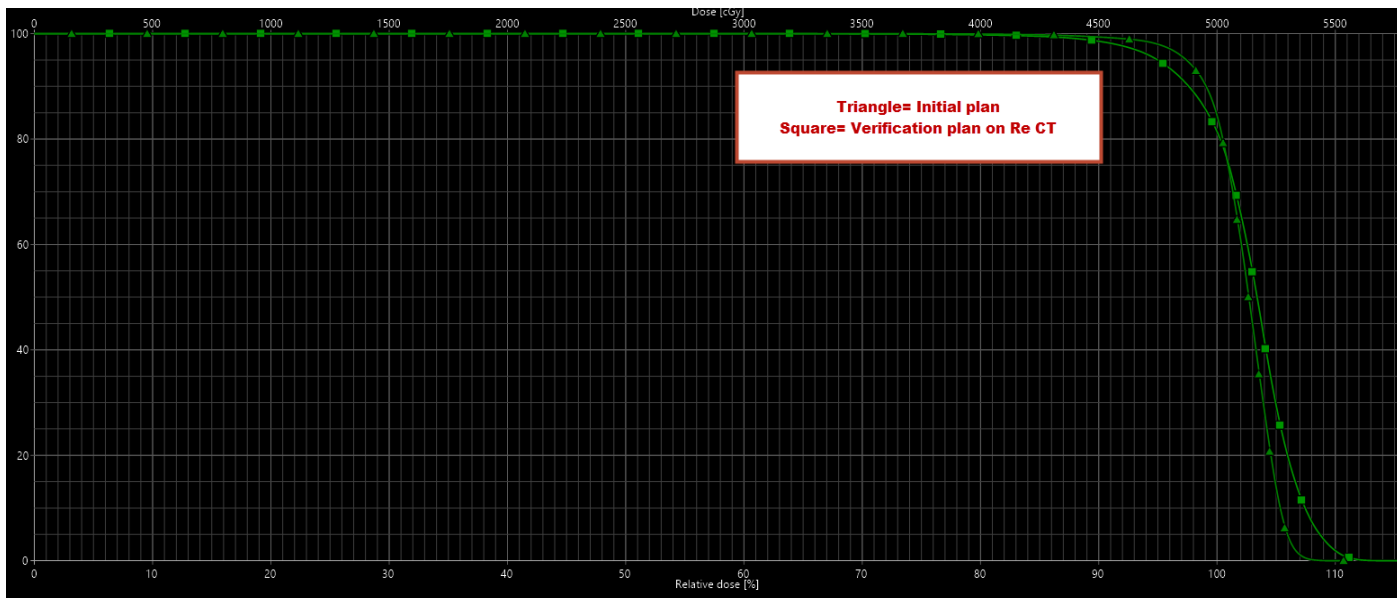


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# Dosimetric Impact of Incorrect Arm Positioning cont.

Left Sclav DVH Comparison of Initial plan with verification plan on Re CT

*Note: loss of coverage and increased hotness*



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# Parameters of Study

- 34 patients treated between 1/1/2023-3/17/2023 using Postural Video
- 330 images were obtained after verifying/aligning to Postural Video  
*Patient's shoulder/arm and hip were adjusted, if needed, with Postural Video before imaging. If adjustments were needed after imaging, imaging was then repeated.*
- Images evaluated by number and percent of repeat images needed for proper alignment

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# Results

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# Results of Postural Video Study

Total # of images	# of repeat images	Percentage of repeat Images
330	48	14.5%

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# Comparison of pre and post implementation of Postural Video

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# Comparison of pre and post implementation of Postural Video

30 patients from 2022 and 2023  
18 IMRT planned patients  
12 3D Conformal planned patients

## 2022

- 319 images obtained after using VisionRT AlignRT feature

## 2023

- 297 images obtained after using VisionRT Postural Video feature

*2023 data of only known documented use of Postural Video*

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# Data Results

Case Studies	# Of Images Taken	# Of Repeat Images	Percentage of repeat imaging
2022 Without Postural Video	319	75	23.5%
2023 Using Postural Video	297	49	16.5%

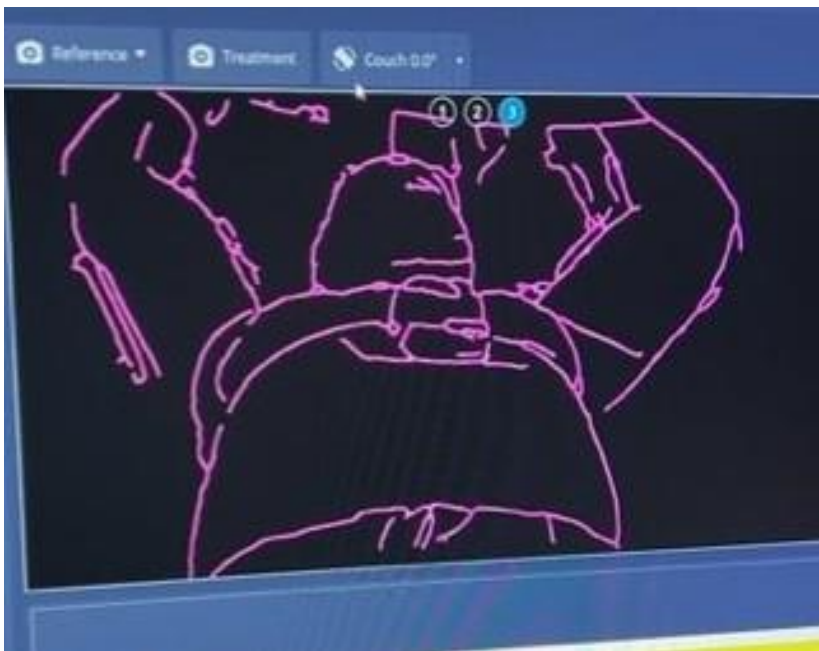
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# Different VisionRt Systems

SGRT surface on  
TrueBeam 1 system (planned machine)

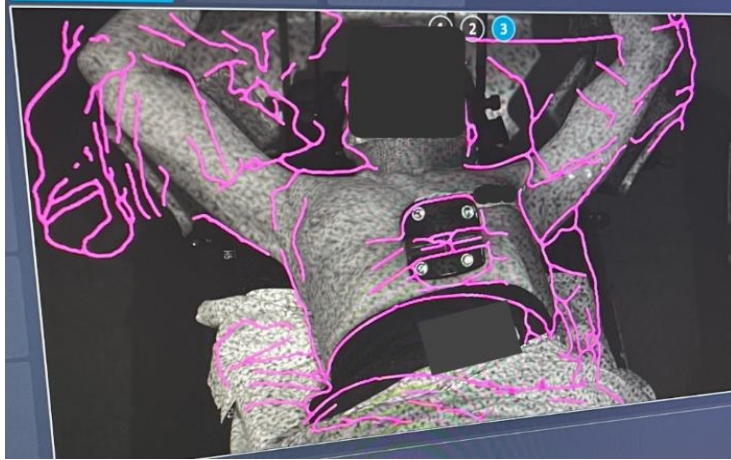


VS

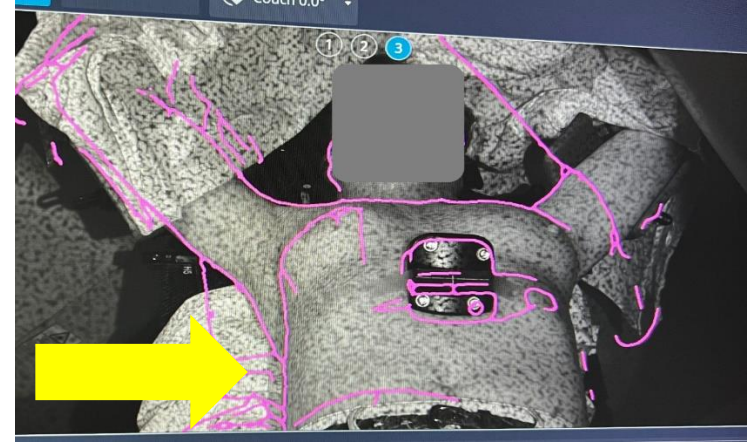
Same patient SGRT surface displayed on  
TrueBeam 2 system



# More Than Enough VS Not Enough



- Too many contours
- Contours vacbag instead of arm
- Make sure arms are not covered
- Future versions editable?



- Shadows may occur making it difficult to see body surface from table side

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# Points to Ponder

- Contour lines for RPM box placement daily
- Potential to catch set up errors in equipment
- Monitor difficult patients for movement/coughing
- For Non-Daily imaging patients, repeat imaging for positioning also causes imaging to be repeated for the next treatment day.

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# Thank You

To learn more about Ohio State's cancer program, please visit **cancer.osu.edu** or follow us in social media:



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