Optimizing Prone Breast Simulations and Treatments

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Introduction

- Stamford Hospital, CT
- Collaboration with Brigham and Women's Hospital and Dana-Farber Cancer Institute
- 2 TrueBeam linacs
- 1 Toshiba CT/Sim
- 30 - 40 average patient load

Agenda

- CT/Sim considerations and tips
- Drawing an effective ROI
- Start-to-finish first day patient set-up
- Troubleshooting a difficult patient set-up
- Set-up tips and tricks

Why Prone?

- Prone breast set-ups are notoriously challenging and often avoided.
- Provide multiple clinical benefits.
- Through continuous refinement of our techniques over the past few years, we have improved prone breast setup accuracy, resulting in smaller shifts, fewer re-setups, and more efficient imaging overall.

CT Simulation

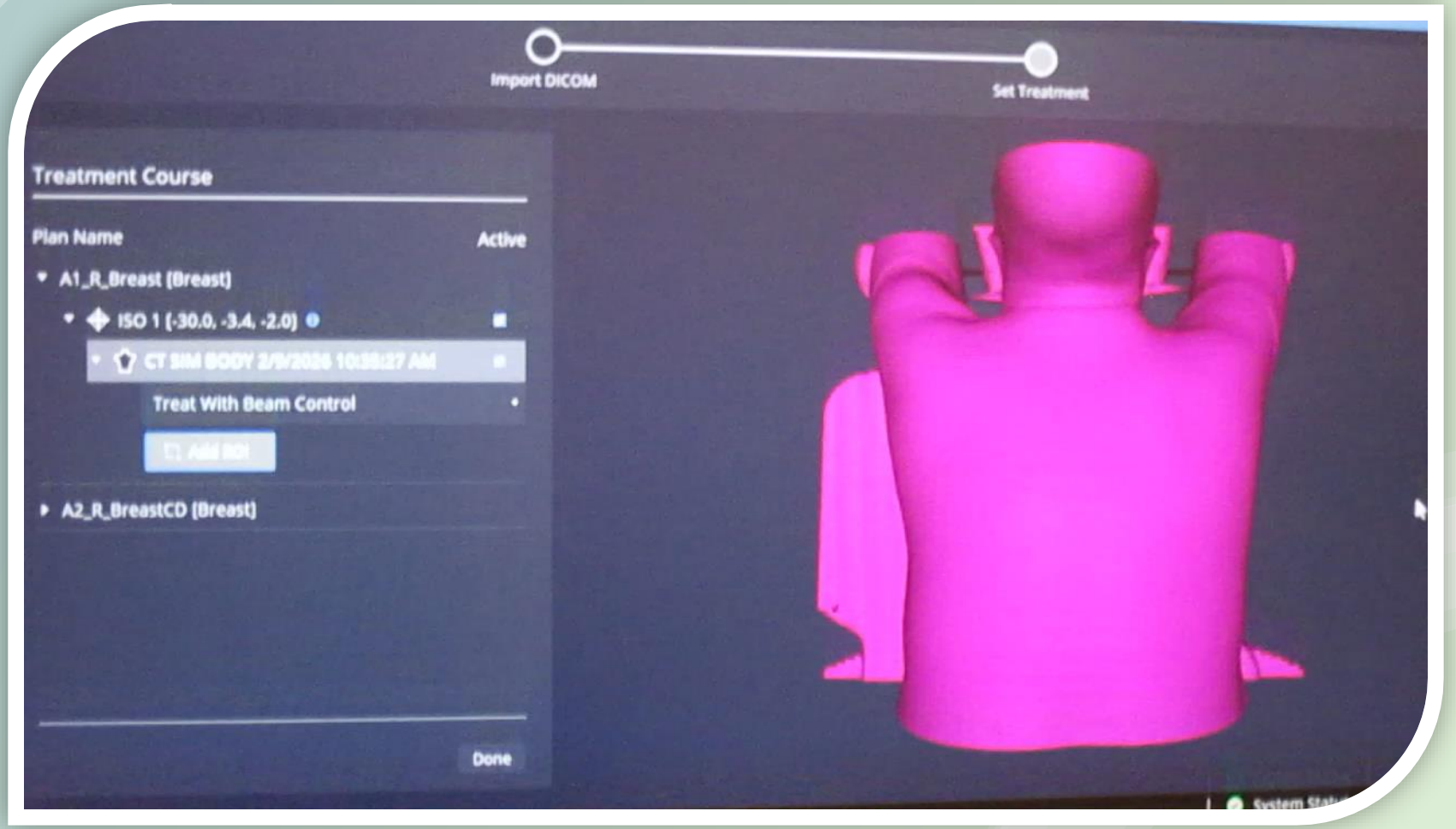
Orfit Sagittilt

Considerations When Simulating

- Arms pulled forward to reduce tension
- Spa cushion
- Rib placement
- Lateral placement
- Table-top measurement: 20+
- Minimize tissue variation

Drawing the ROI

- Structure set should include board
- ROI should start as horseshoe shape and adjust as needed
- Include shoulders/scapula, extend to cover patient's sides

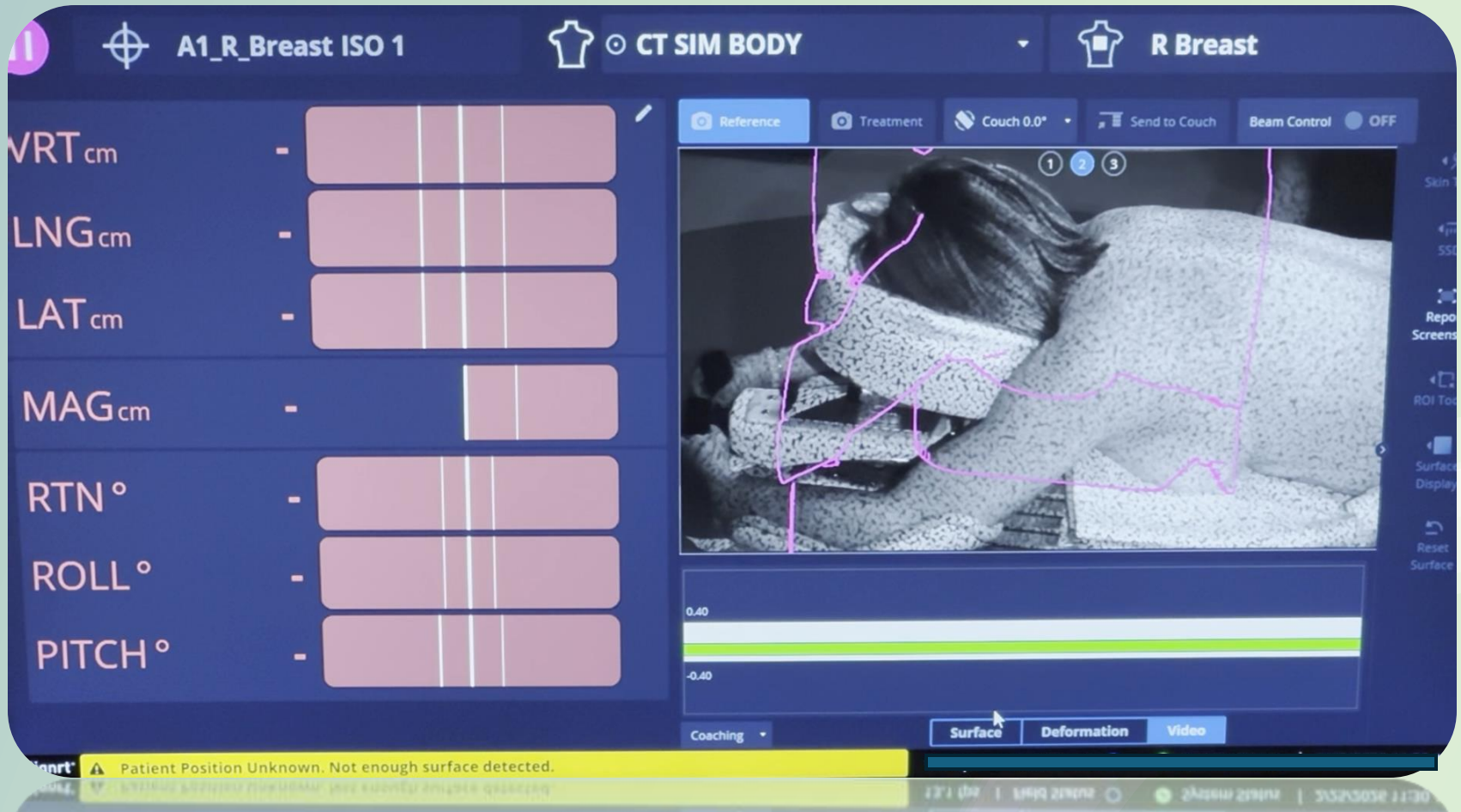


Editing the ROI

- Adjust ROI based on camera visibility
- Place piece of paper or sheet on table if capturing permanent reference

VSim Day

- Laser number and board contour are aligned
- Drive to tabletop (vert)
- Verify lateral placement is correct
- Deltas and contours match
- Check lateral SSD



VSim Day

Pre-Shift

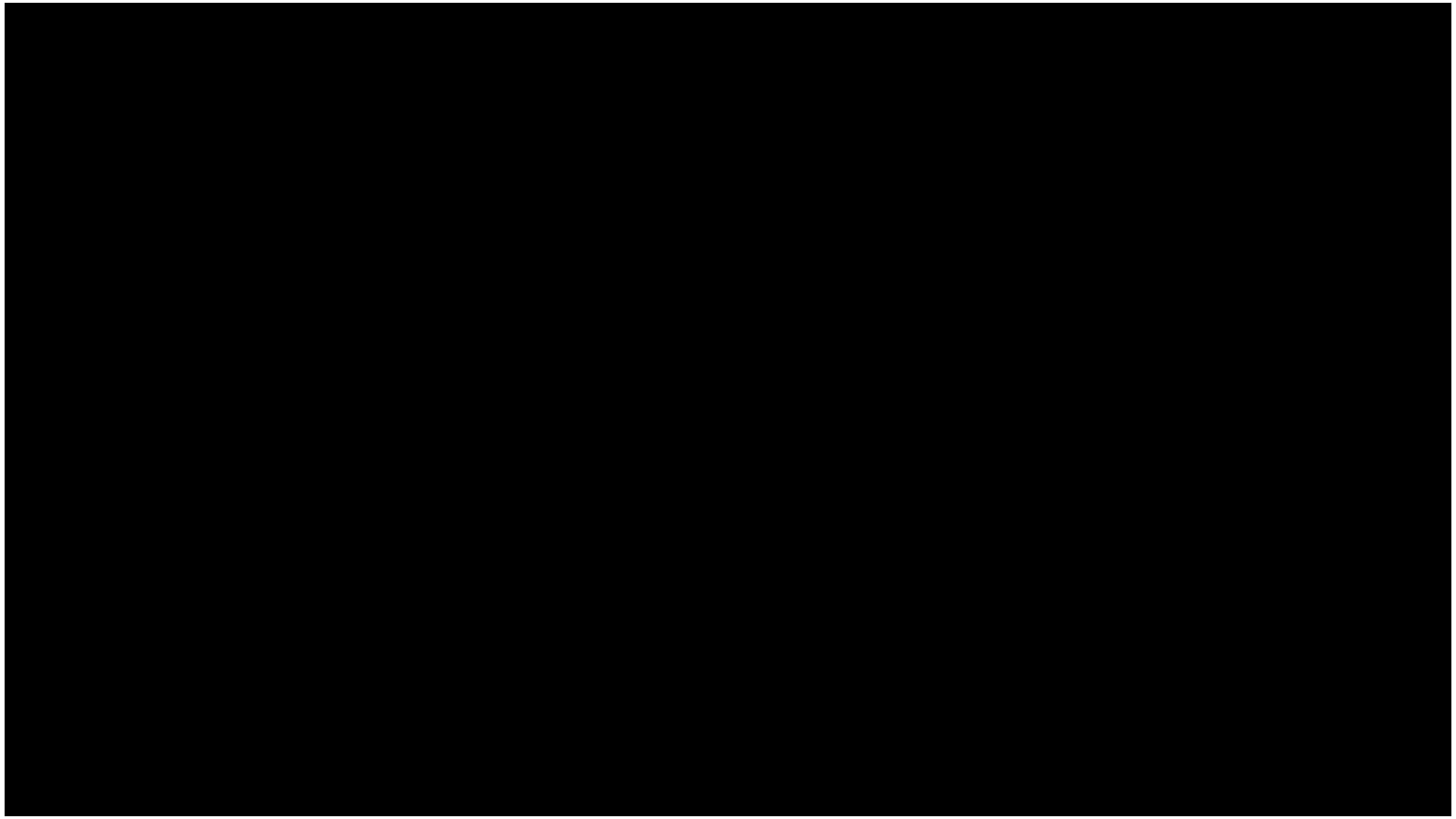
Post-Shift

Troubleshooting a Challenging Set-up

1st Troubleshooting Attempt:

- Deltas and contours were aligned, but CBCTs showed large lateral shifts (>0.5cm)
- Applied shifts and captured SGRT reference after three days
- Same problem persisted in following days

Troubleshooting a Challenging Set-up



Troubleshooting a Challenging Set-up

2nd Troubleshooting Attempt:

- Set up patient until deltas and contours aligned
- Checked lateral SSD before imaging and left delta as pictured

Troubleshooting a Challenging Set-up

3rd Troubleshooting Attempt:

- Created alternate ROI to compare deltas
- New ROI solved delta and SSD discrepancy

Troubleshooting a Challenging Set-up

Troubleshooting a Challenging Set-up

Set-up Tips: Pitch

Negative pitch, positive long = Pull arm forward

Negative pitch, negative long = Pull patient down

Set-up Tips: Arms

Set-up Tips: "Kickstand"

An alternative way of correcting a roll.

Set-up Tips: Breast Tissue Adjustment

Deltas and contours match, SSD is off = pulled contralateral breast out to get SSD closer

Deltas are good, breast contour looks off = pulled breast tissue out to match contour

Pitch and Longitudinal	
Pitch (+)/Long (+) Move patient superiorly so shoulder rises	Pitch (+)/Long. (-) Move arms inferiorly
Pitch (-)/Long (-) Move patient inferiorly so shoulder relaxes	Pitch (-)/Long (+) Move arms superiorly

Rotation, Roll, and Lateral	
Rotation and roll in same direction = Relax shoulder	Rotation and lateral in same direction = Pull hips
Negative pitch and roll = Pull arm forward	Positive pitch and roll = "Kickstand"

Summary

- Don’t be afraid of prone breasts!
- Take your time in CT/Sim to ensure patient comfort
- Ensure ROI is drawn appropriately and visible to cameras
- Follow standardized steps on Vsim day
- Try alternate ROIs if set-up is not ideal
- Be patient and take your time, see the whole picture

Thank you!

Questions?

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