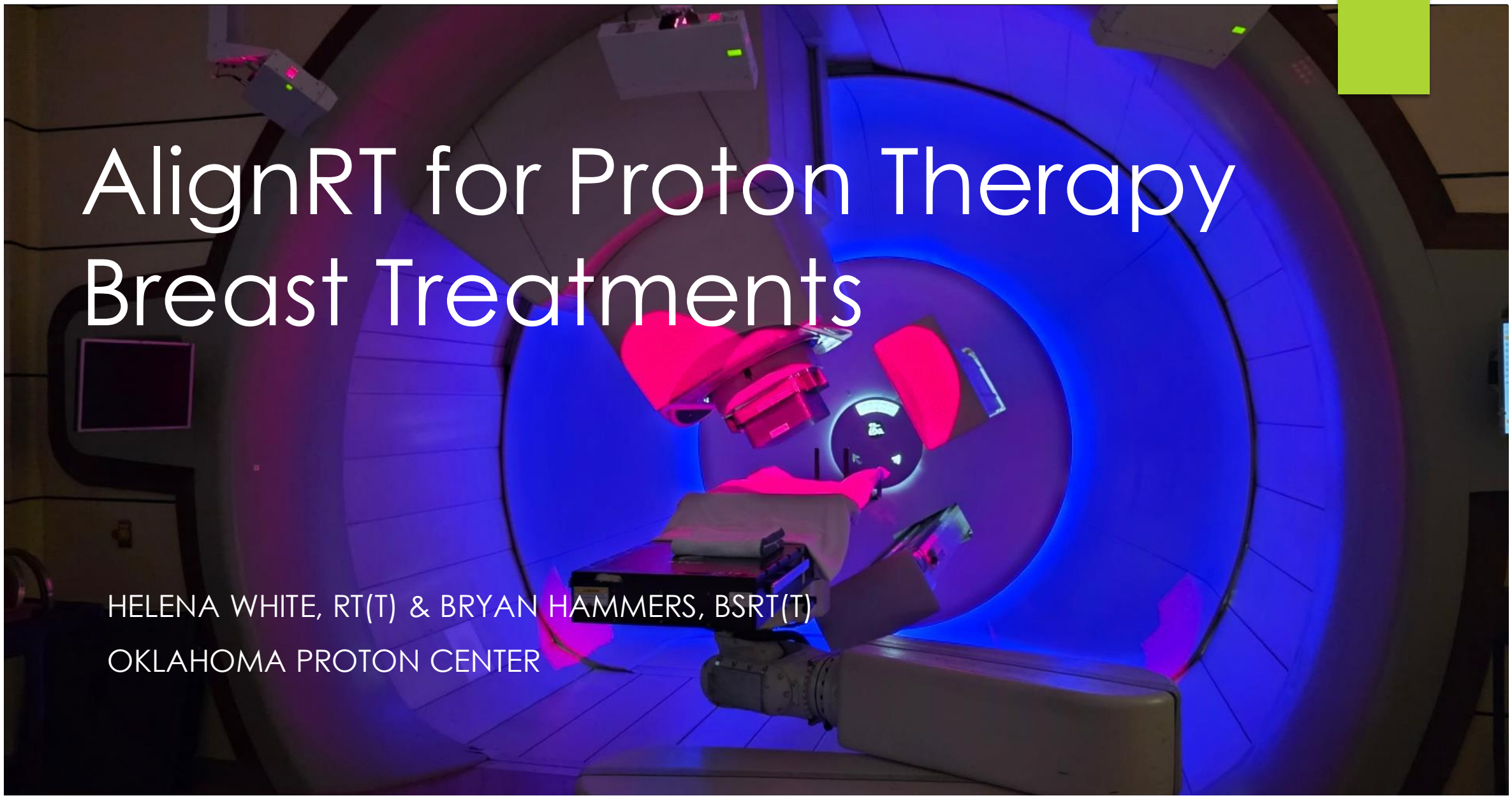

AlignRT for Proton Therapy Breast Treatments

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OKLAHOMA PROTON CENTER

Oklahoma Proton Center est. 2009

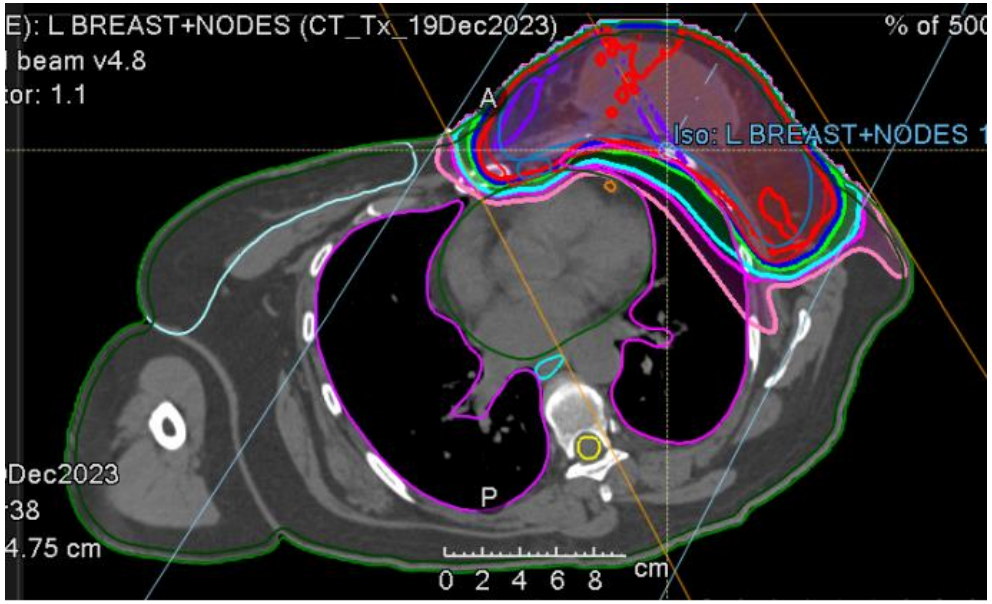
- IBA machine manufacturer
- 4 Treatment Room Facility
- 1 Gantry, 2 Incline Beams, 1 Fixed Beam
- Stereoscopic X-Ray Imaging
- Uniform Scanning w/ apertures & compensators
- All breast treatments:
  - Gantry room (360° freedom)
  - Incline beam room (treatment only @ 30° and 90°)

OPC BREAST SETUP POSITIONING

- Treatment side arm up, contralateral arm down
- Head turned away from affected side
- Rolled up on treatment side

So why rolled position & not simulated flat?

- In effort to plan for incline beam room



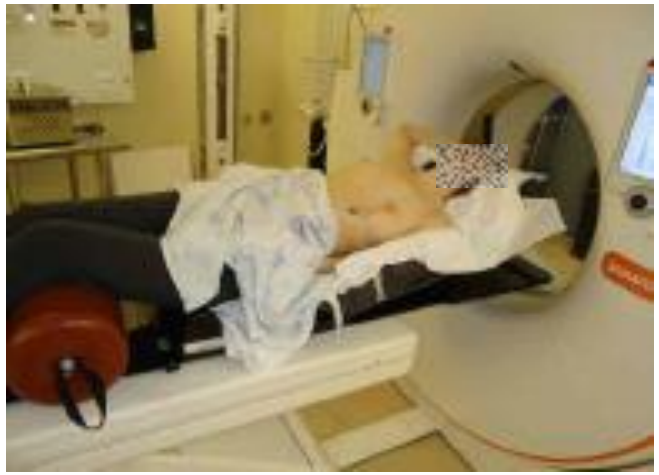
OPC Breast Setup Challenges

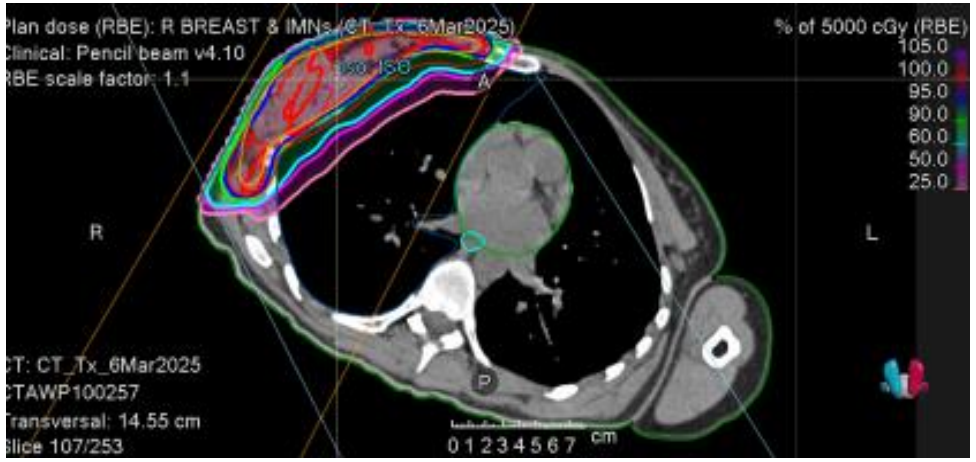
- **2 Main Reproducibility issues: Roll & Arm position**

- 1. *Roll*

  - Difficult & time consuming to adjust patient for appropriate roll

  - Table does allow for 3 degrees of roll, rotation, & pitch

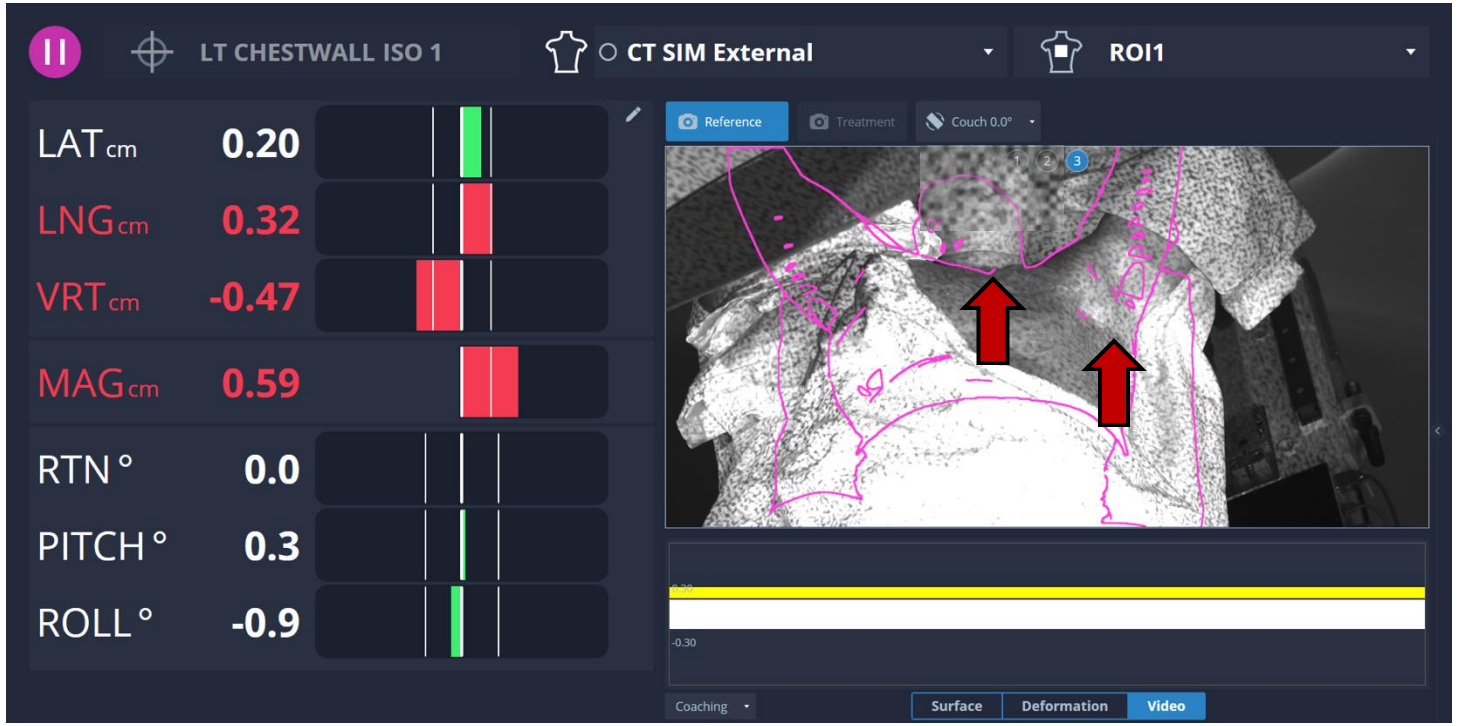




OPC Breast Setup Challenges (cont…)

- 2. *Arm Position*
  - Inconsistent arm & chin positioning

These 2 issues led to numerous x-rays and patients being on the table longer than necessary



Implementing AlignRT & Our Experience

- Ease of using AlignRT in treatment room
  - Monitors in imaging console area & in treatment room
  - Convenient to switch between surface and video function to efficiently setup patient
- Ease of transition to using AlignRT with patients
  - Patients are already uncovered for breast treatments while using protons
- We adjust X, Y, Z, roll, & rotation prior to imaging

Positive Experiences with AlignRT

- Postural Video
  - Able to see arm placement
  - Can adjust patient's roll prior to imaging
    - Enormous benefit
  - Creates easy, accurate, & quick set up all prior to imaging
    - Being able to adjust roll & rotation prior to treatment is a HUGE time saver
- Minimal Shifts
- Confidence that patient has not moved during treatment

Pre-Imaging, post arm & roll manipulation

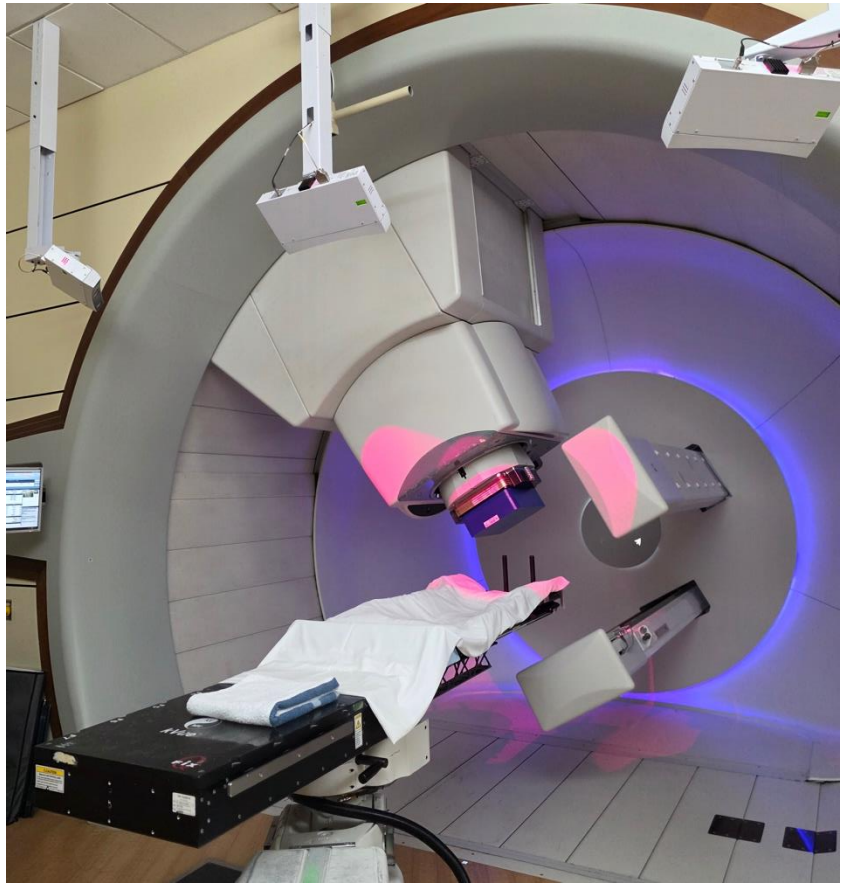
Placement of Bad Arm vs Good Arm

Pre-Imaging,
Before arm manipulation

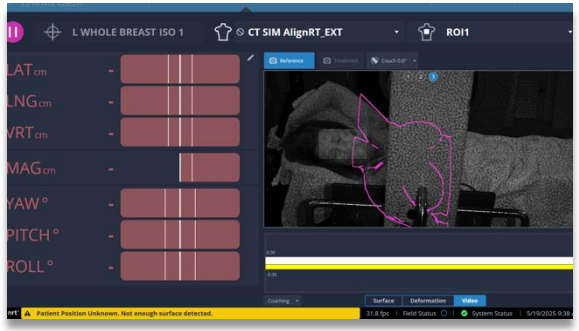
Pre-Imaging,
After arm manipulation

Challenges with AlignRT

- Camera placement with size of the Gantry
  - Sometimes creates unseen areas, typically around clavicle
  - Dependent on location of Gantry & imaging panels



Challenges with AlignRT



X-ray arm in place

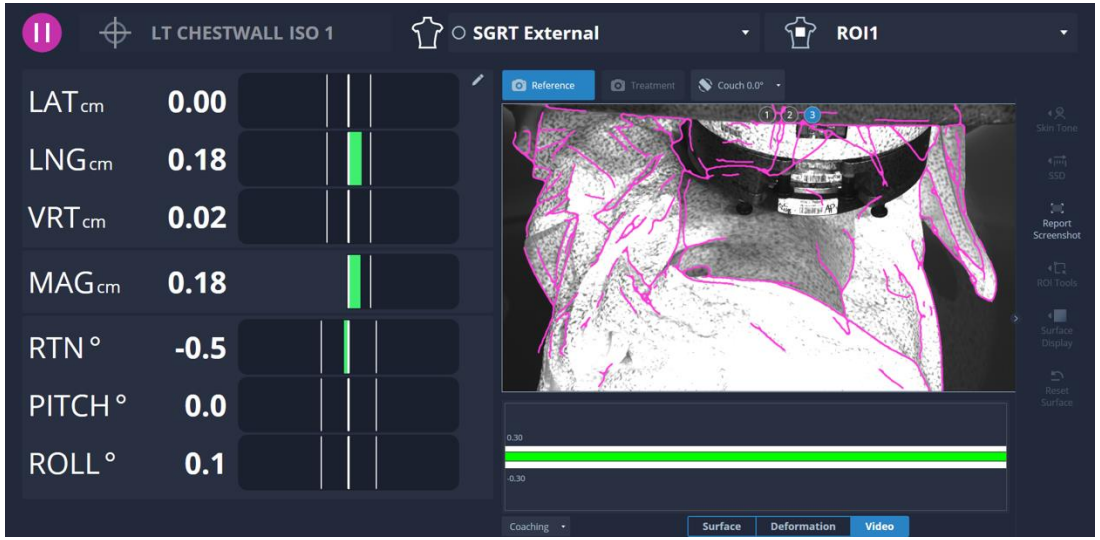
Blind spots created when x-ray arm is in place

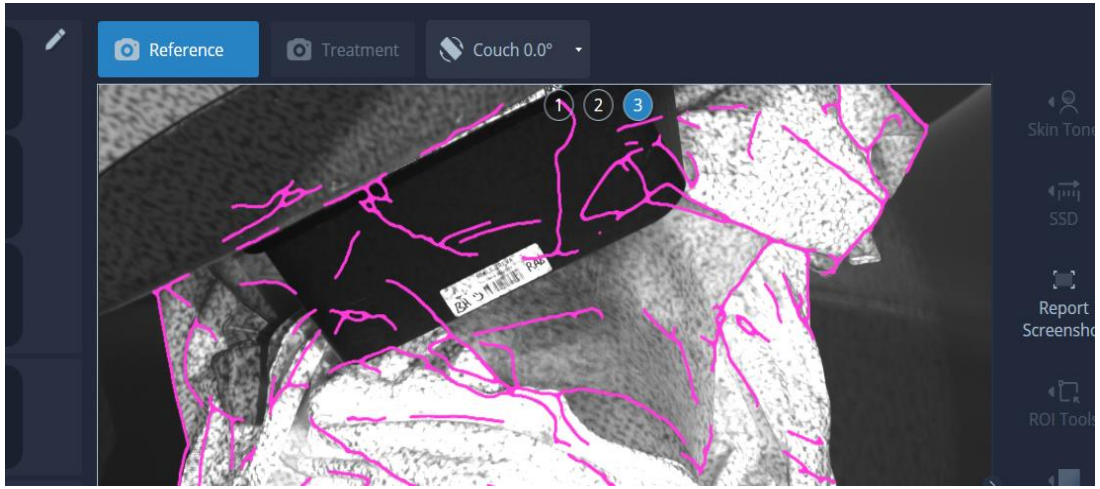
Gantry @ 30°

One camera angle blocked by gantry at treatment position

Challenges with AlignRT (cont…)

- Limited view of surface anatomy once snout is in treatment position
  - Most common with 30x40 snout
  - ROI ***still*** tracks even with snout in position





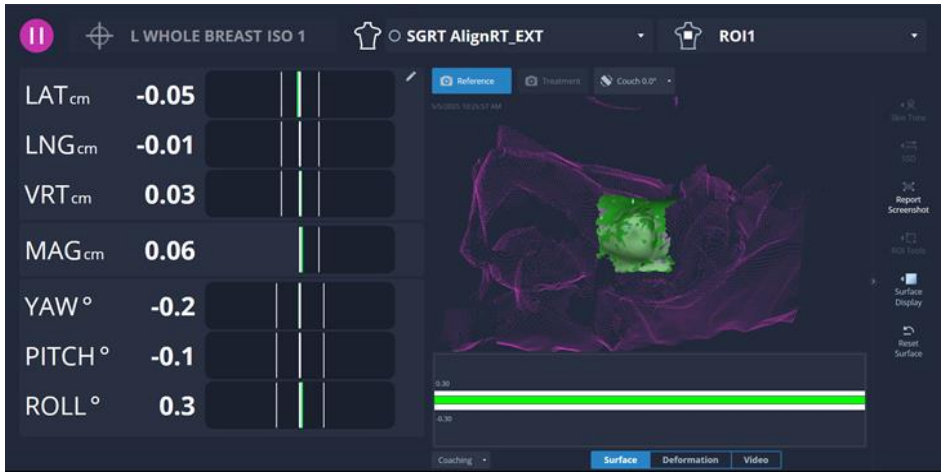
Resolution to Challenges

- Have snout fully retracted during initial setup of patient
  - This gives a clear view of patient's surface anatomy in Postural Video

Resolution to Challenges (cont…)

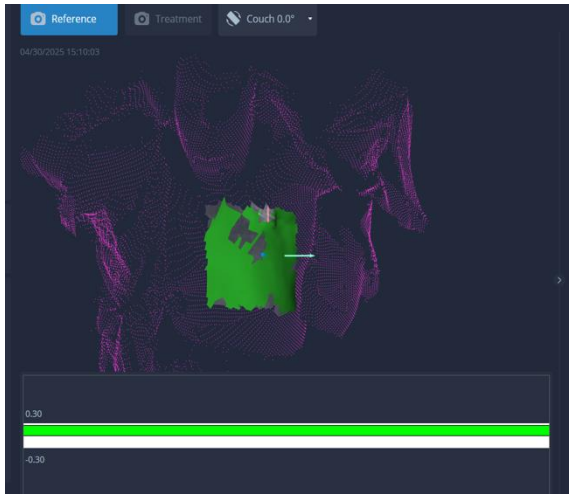
- ROI is crucial
  - Cover full breast surface anatomy when drawing initial ROI
  - Avoid any major creases or folds (if possible)
  - Make sure linen is completely out of the way of the ROI field
  - Adjust/Edit ROI as needed during patient's initial block check/treatment

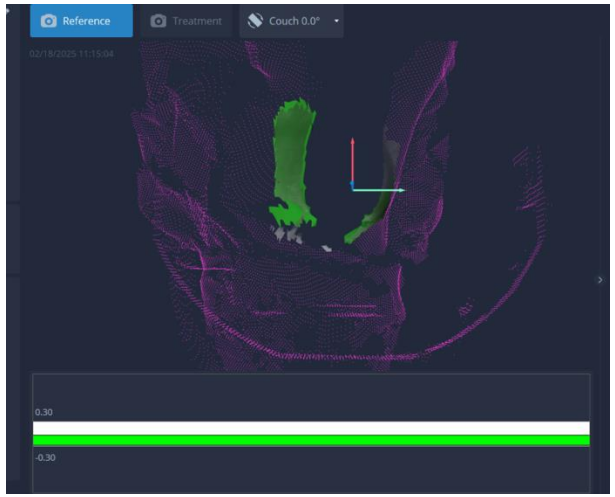
This helps ensure there will not be any unseen areas or complications from gantry angle, X ray panels, etc.

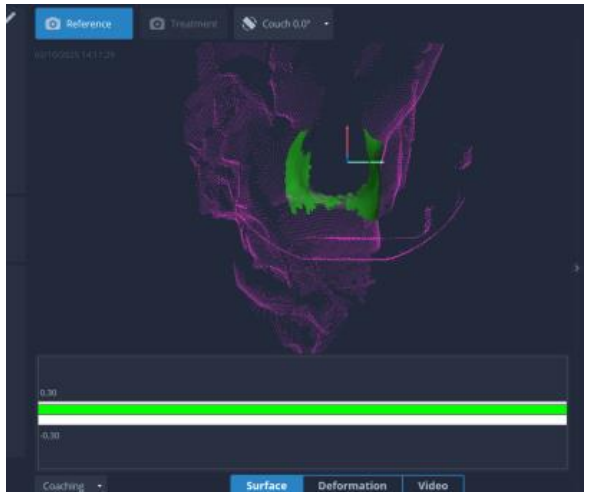


Resolution to Challenges (cont…)

- Once snout is in treatment position, you may have the center portion of ROI blocked, but can still visualize the outside portion of ROI
- OPC has yet to have any instances where the ROI did not track during a breast treatment

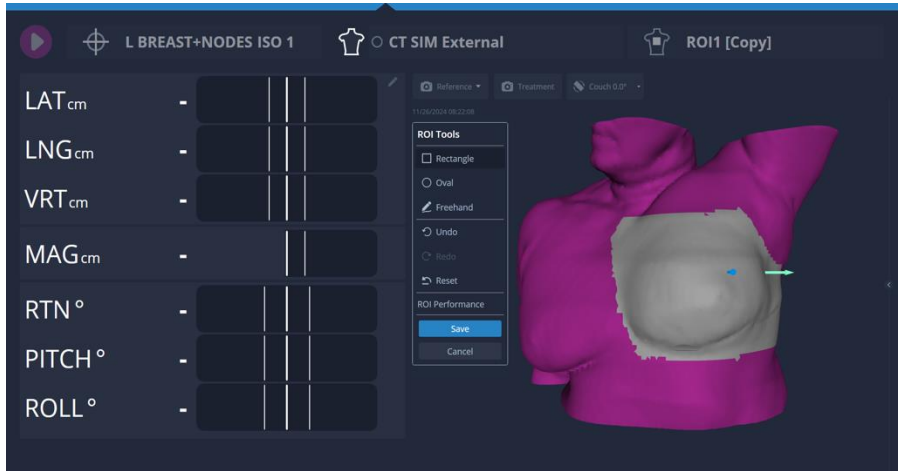


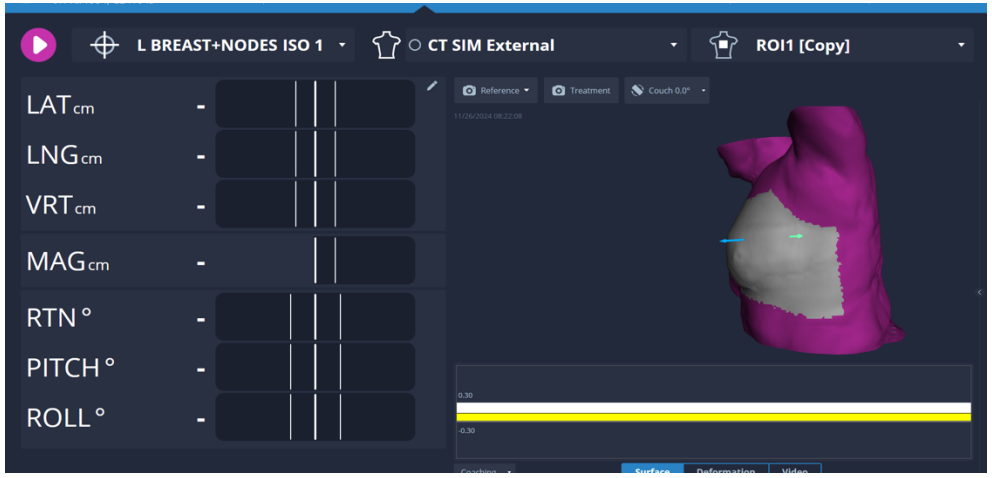




Good ROI's

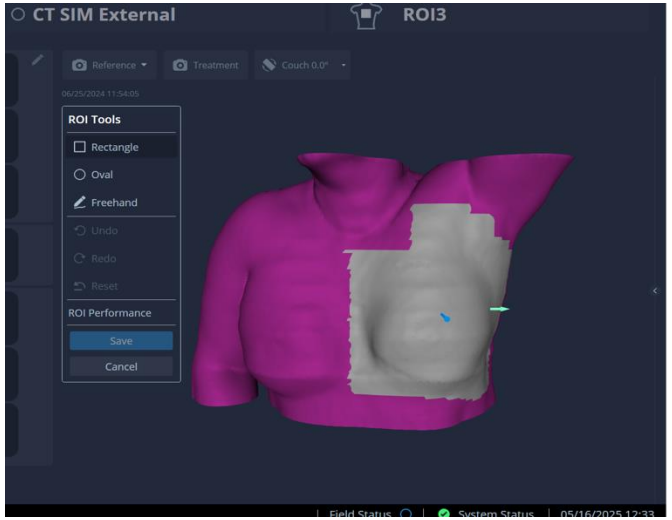
- Whole breast selected to midline
- 1-2 cm above & below breast
- Drawn half-depth side of body
- Avoid armpit creases



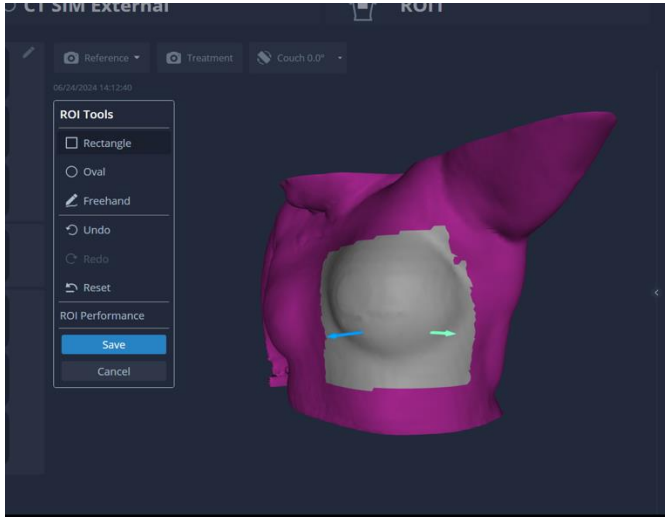


Bad ROI's

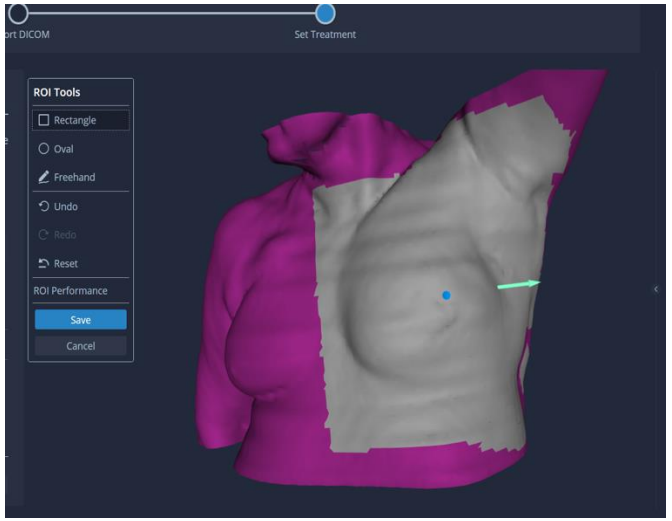
- Crosses Midline slightly
- Extends up too high & into armpit



- Drawn too far down into abdomen



- Everything bad
- Cross midline, extend too high, too far down side, & too low



Final Thought

- AlignRT has a true benefit in:
  - Reducing imaging time & amount of x-rays taken
  - Accurate arm placement
  - Ensuring patient hasn't moved during treatment time
- AlignRT has minor obstacles to overcome:
  - Snout position, gantry position, & imaging position
- Overall, AlignRT has a true benefit to our center. The obstacles are all possible to overcome and the system can still be used for its intended purpose.
- OPC has been able to use AlignRT effectively for all breast cancer patients since installation

Questions?