REACHING NEW HEIGHTS WITH SGRT

SURFACE GUIDED RADIATION THERAPY
SGRT COMMUNITY

Broad Implementation of SGRT: Faster, More Accurate Treatments

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Mayo Clinic Cancer Center

Broad Implementation of SGRT: Faster More Accurate Treatments

Wendy Tisue MBA, RTT (R)(T)

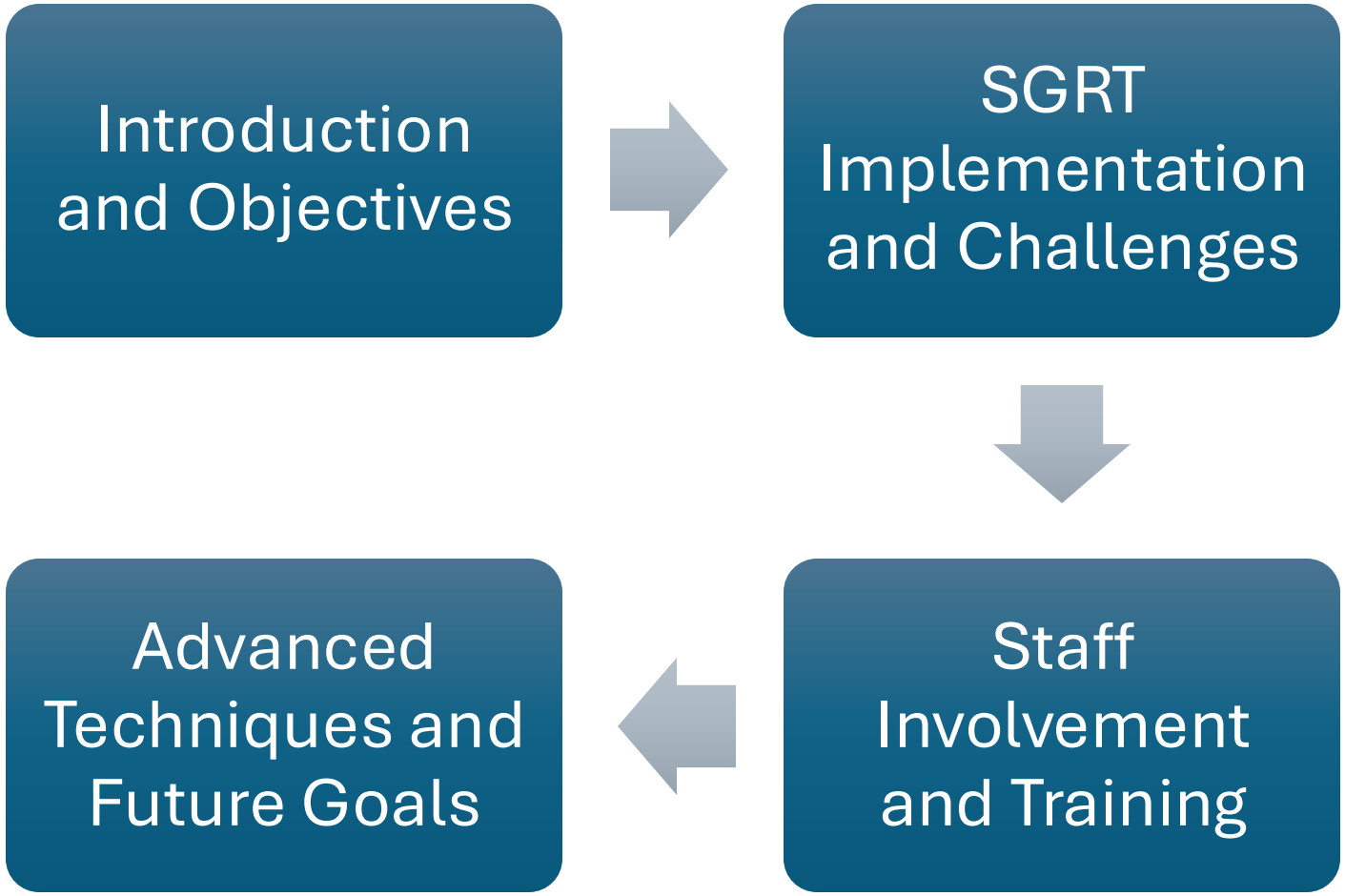
Mayo Clinic AZ

- Mayo AZ started Its radiation oncology program in 1989.
- Proton Clinic opened in March of 2016
- We have 4 Proton Hitachi Probeat half gantries. 2 CT On Rails, 3 CT Simulation Rooms, 4 Varian TrueBeams and a HDR unit.
- 15 Physicians, and 50+ RTT’s
- Our Proton Clinic treats from 7am-6:30pm; Photon side typically treats from 7a-4:30pm

Disclosures

No Disclosers

Agenda


Introduction and Objectives
SGRT Implementation and Challenges
Staff Involvement and Training
Advanced Techniques and Future Goals

Learning Objectives

Transitioning from a multi vendor systems to a single vendor

How to increase staff engagement

How to implement an SGRT system

What sites we started with

What are our future goals

SGRT Implementation and Challenges

Why Photons was not excited about SGRT at first

Our Photon clinic opened its first True Beam in 2016.

One feature that was advertised was AlignRT/OSMS

Did we like it and use it initially?

- Active monitoring only-It would turn the beam off if the tolerances fell out
- Hard to override
- Hard to use
- User Interface was lacking
- Did not feel that it added a benefit to the patient or the clinic at the time

So… What changed???

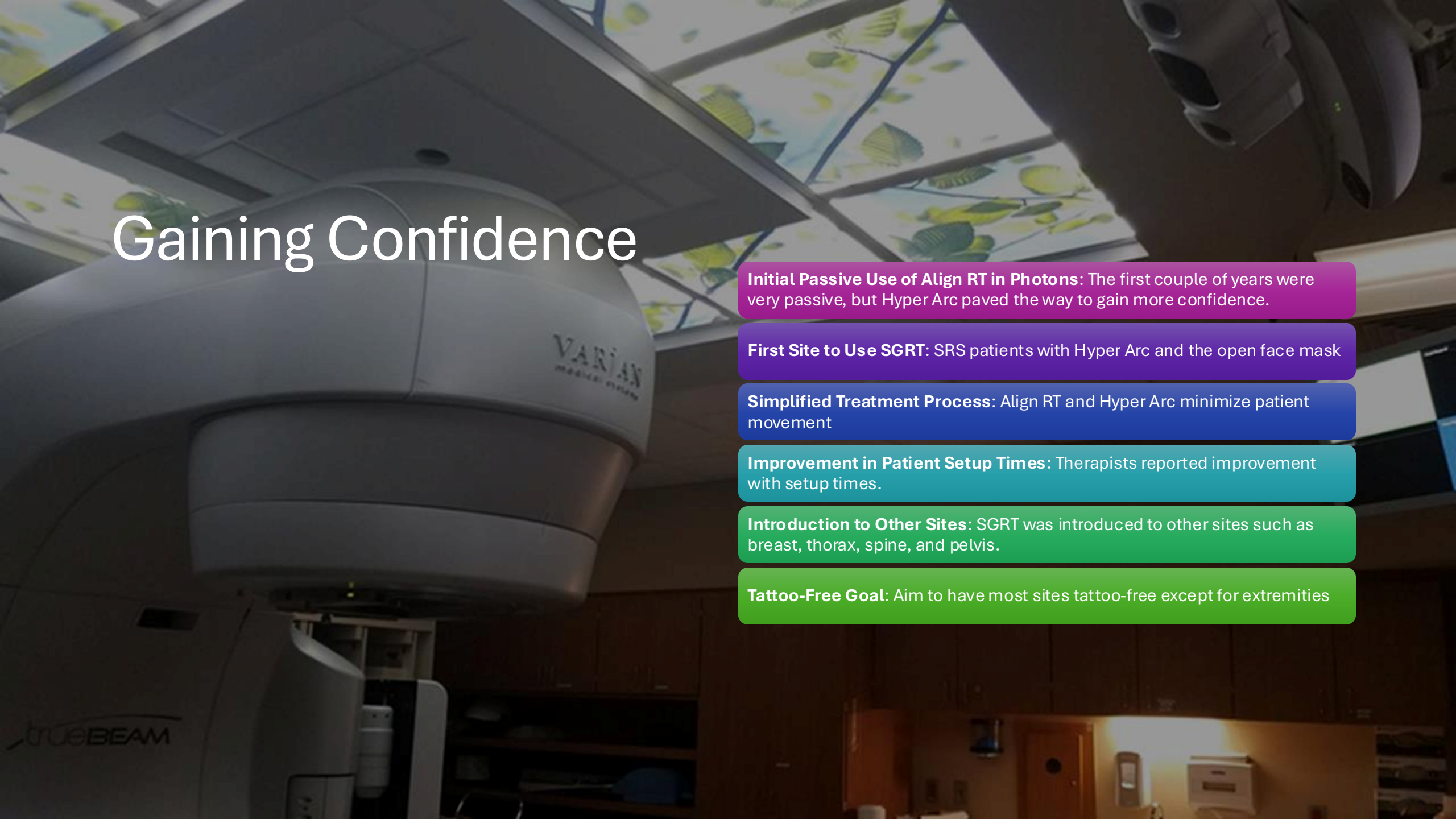
What Changed??

The push from Staff to use SGRT → The upgrade to AlignRT!!!! → SRS/Hyper Arc and the Open-Faced Mask

AlignRT upgrade that allowed for a better user interface → Auto Authorize feature → Postural Video!!

Amazing Training

Gaining Confidence



Initial Passive Use of Align RT in Photons: The first couple of years were very passive, but Hyper Arc paved the way to gain more confidence.

First Site to Use SGRT: SRS patients with Hyper Arc and the open face mask

Simplified Treatment Process: Align RT and Hyper Arc minimize patient movement

Improvement in Patient Setup Times: Therapists reported improvement with setup times.

Introduction to Other Sites: SGRT was introduced to other sites such as breast, thorax, spine, and pelvis.

Tattoo-Free Goal: Aim to have most sites tattoo-free except for extremities

Protons and SGRT

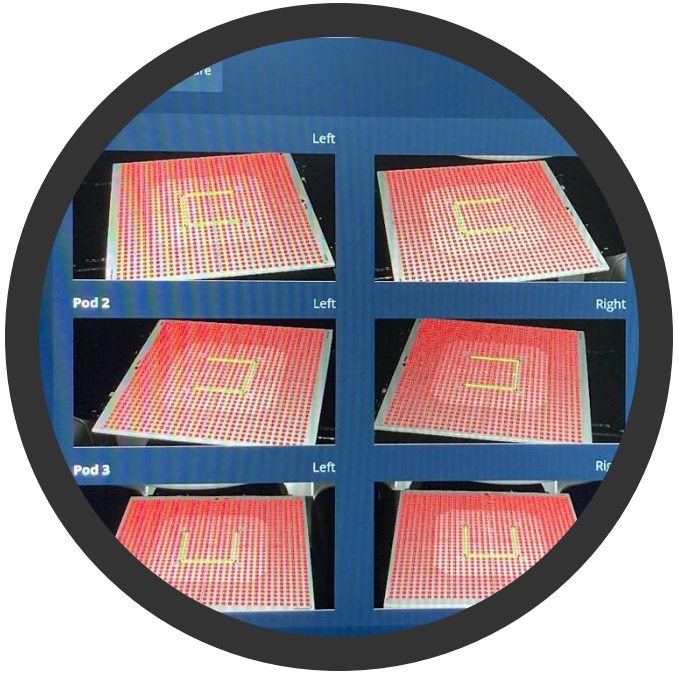
Opened Protons in 2016

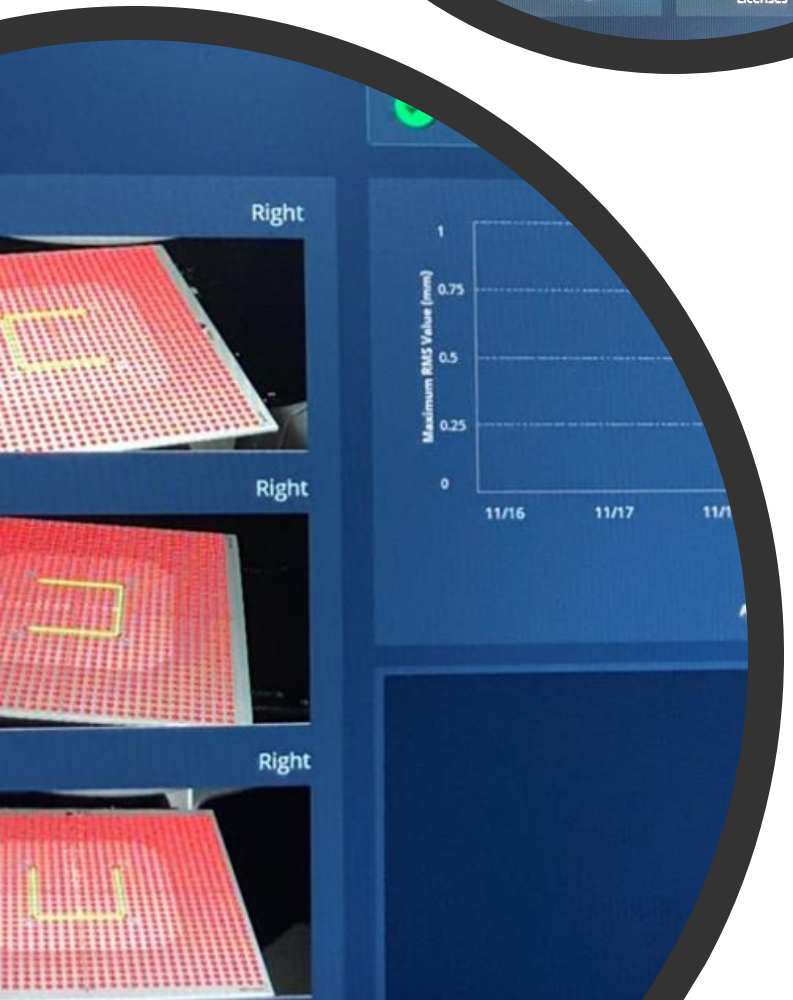
Initially we did not have an SGRT system.

Utilizing masks for almost every setup-did not allow for easy use of a SGRT system.

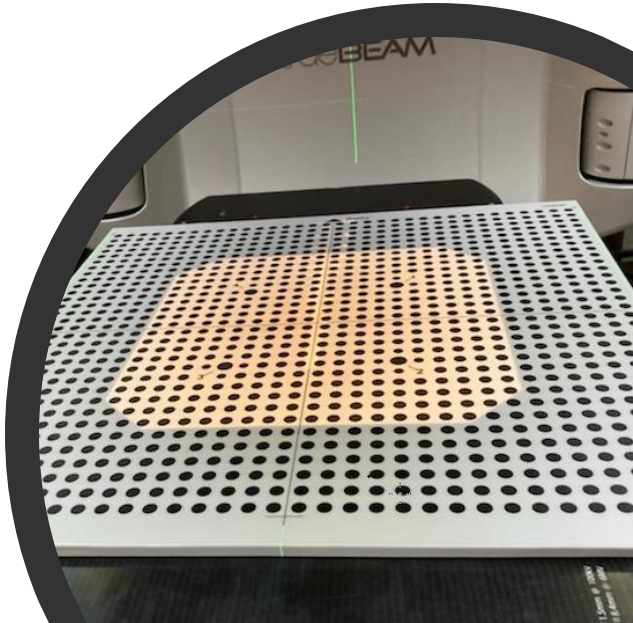
Started looking for a system that may be able to work with the unique challenges of a half gantry proton room and fine tune to our needs.

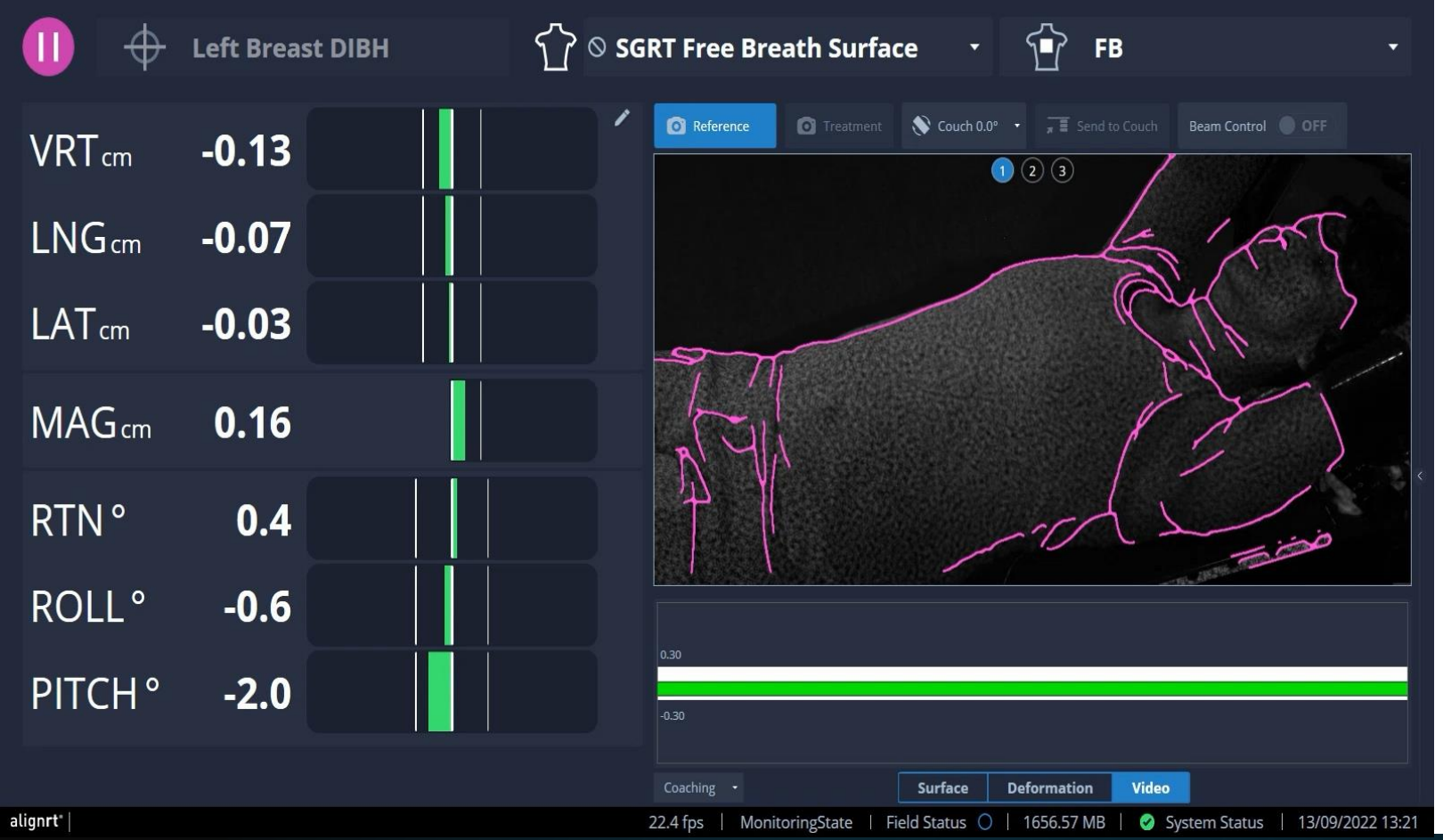
We started using C Rad in 2017, but we only had it in 1 of our 4 proton rooms.

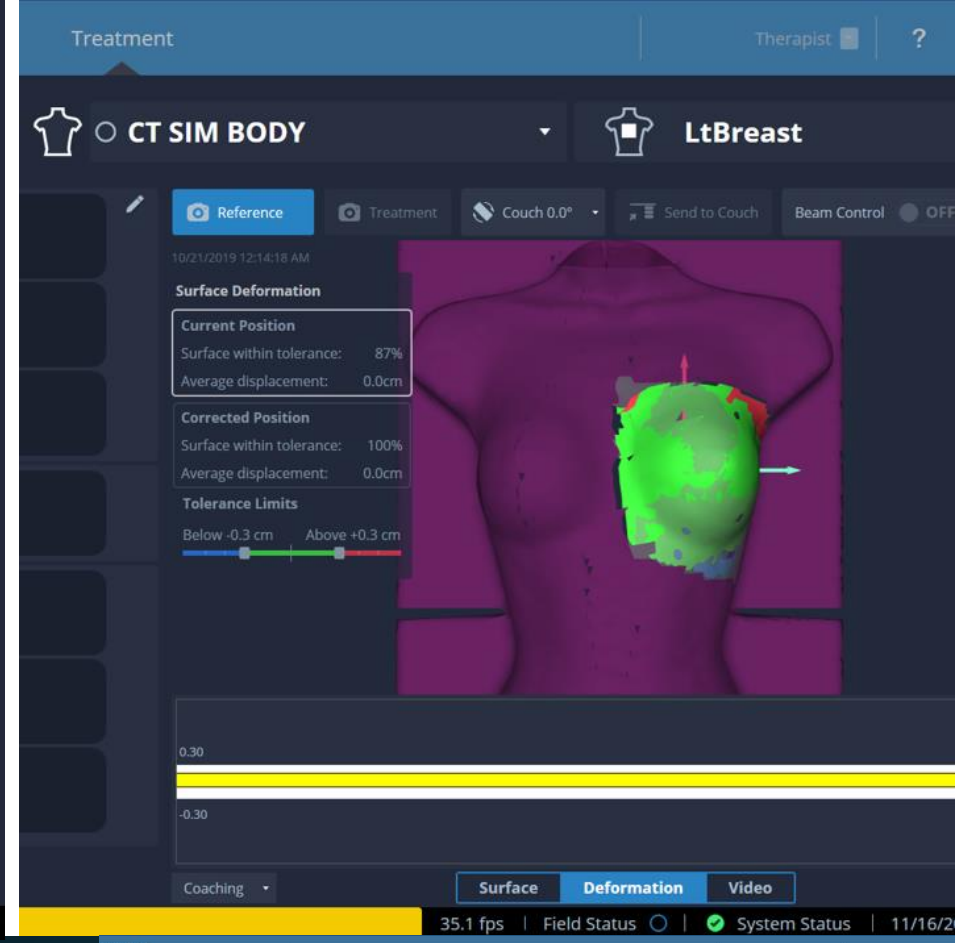




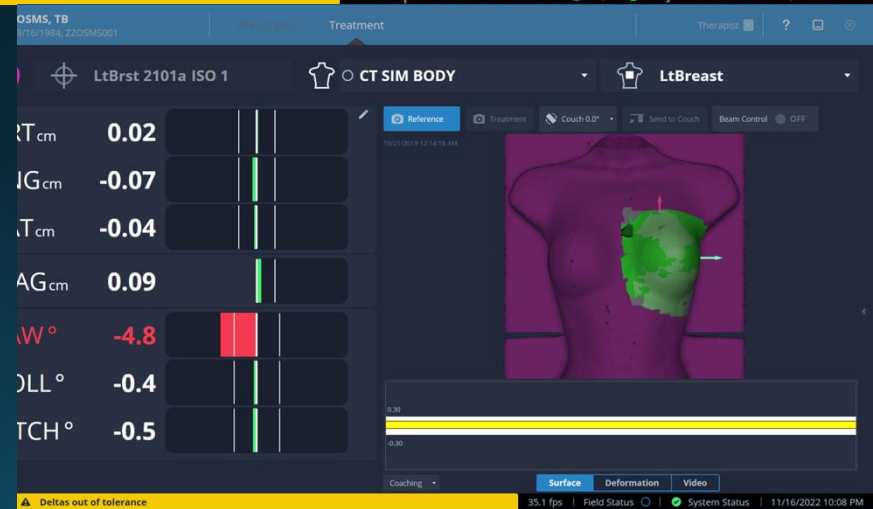
AlignRT Daily QA

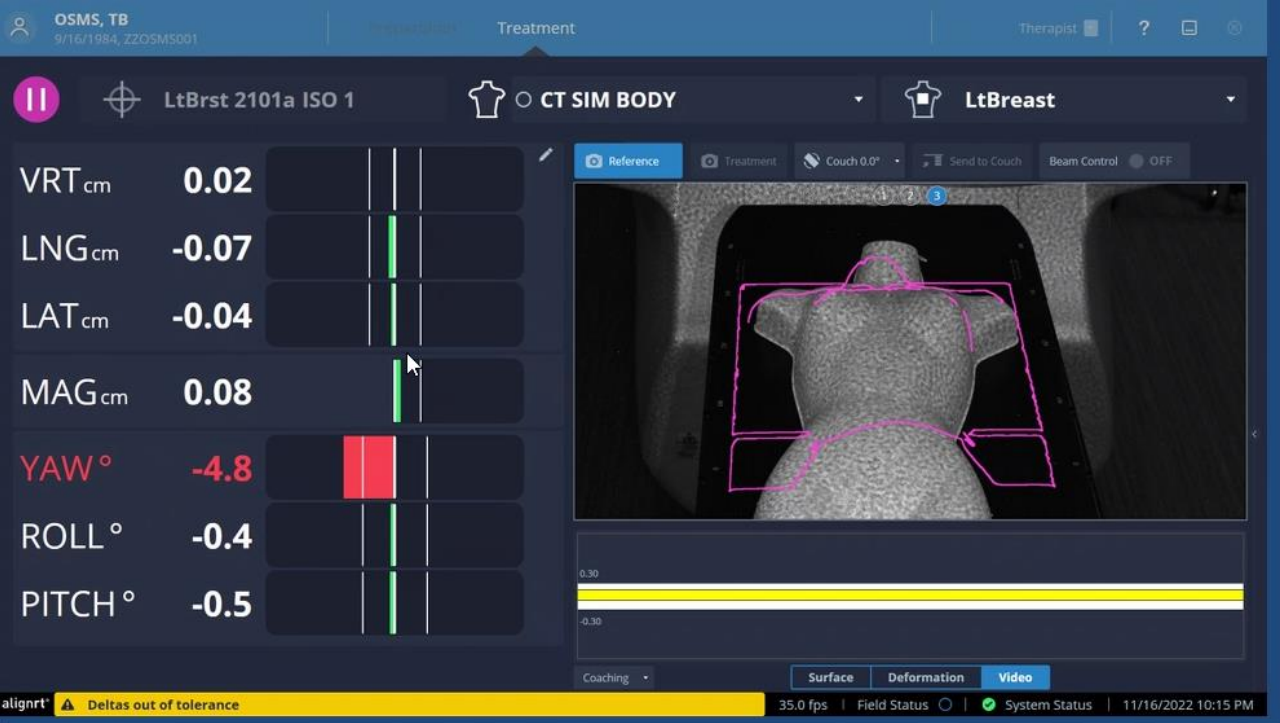






AlignRT Positioning




OSMS, TB
9/16/1984, ZZOSMS001
Treatment
Therapist
LtBrst 2101a ISO 1
CT SIM BODY
LtBreast
VRT cm 0.02
LNG cm -0.07
LAT cm -0.04
MAG cm 0.08
YAW ° -4.8
ROLL ° -0.4
PITCH ° -0.5
Reference
Treatment
Couch 0.0°
Send to Couch
Beam Control OFF
0.30
-0.30
Coaching
Surface
Deformation
Video
Deltas out of tolerance
35.0 fps
Field Status
System Status
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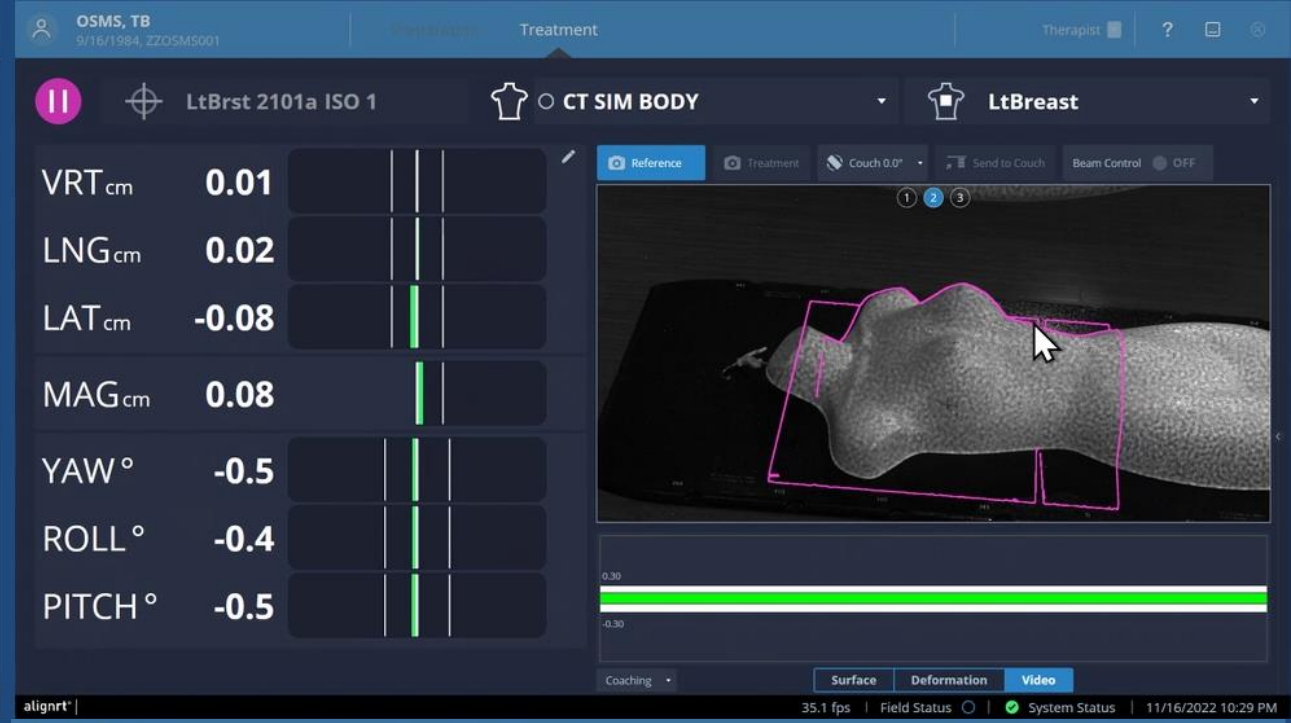
OSMS, TB
9/16/1984, ZZOSMS001
Treatment
Therapist
LtBrst 2101a ISO 1
CT SIM BODY
LtBreast
VRT cm 0.01
LNG cm 0.02
LAT cm -0.08
MAG cm 0.08
YAW ° -0.5
ROLL ° -0.4
PITCH ° -0.5
Reference
Treatment
Couch 0.0°
Send to Couch
Beam Control OFF
0.30
-0.30
Coaching
Surface
Deformation
Video
35.1 fps
Field Status
System Status
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OSMS, TB
9/16/1984, ZZOSMS001
Treatment
Therapist
LtBrst 2101a ISO 1
CT SIM BODY
LtBreast
VRT cm 0.01
LNG cm -0.07
LAT cm -0.03
MAG cm 0.08
YAW ° -4.8
ROLL ° -0.4
PITCH ° -0.5
Reference
Treatment
Couch 0.0°
Send to Couch
Beam Control OFF
0.30
-0.30
Coaching
Surface
Deformation
Video
Deltas out of tolerance
35.4 fps
Field Status
System Status
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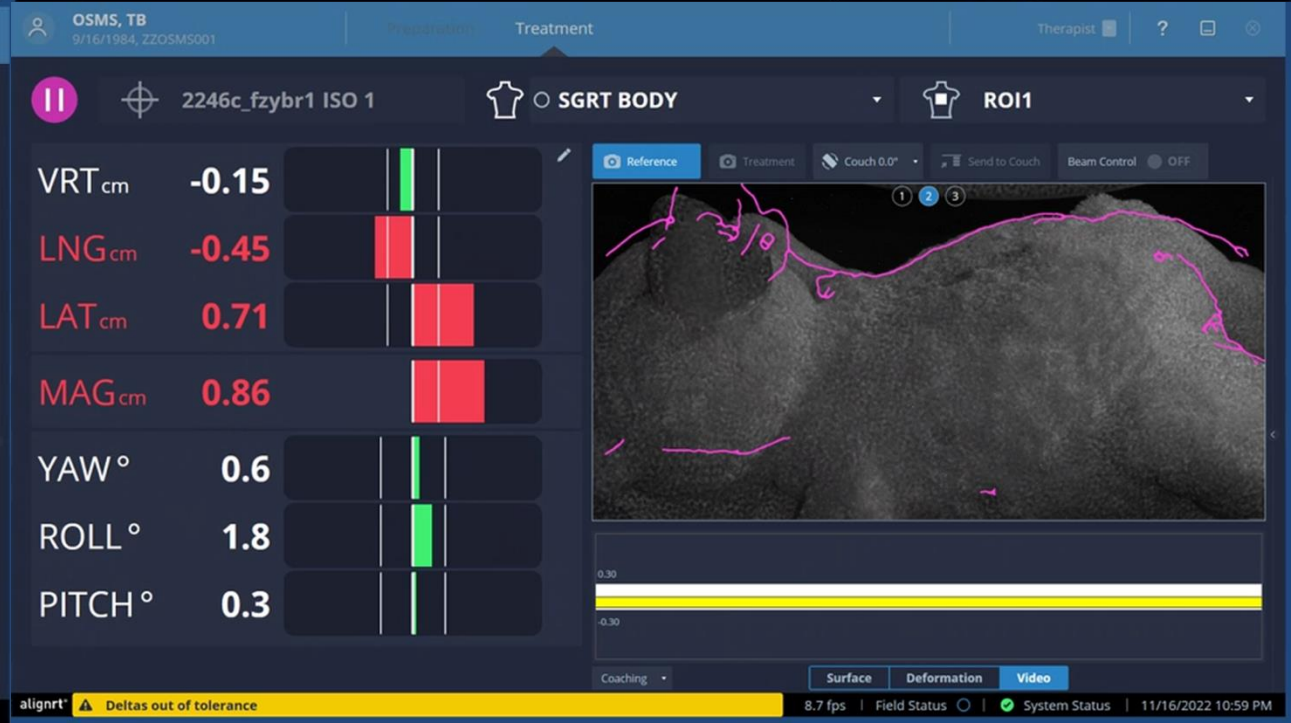
OSMS, TB
9/16/1984, ZZOSMS001
Treatment
Therapist
2246c_fzybr1 ISO 1
SGRT BODY
ROI1
VRT cm -0.15
LNG cm -0.45
LAT cm 0.71
MAG cm 0.86
YAW ° 0.6
ROLL ° 1.8
PITCH ° 0.3
Reference
Treatment
Couch 0.0°
Send to Couch
Beam Control OFF
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Coaching
Surface
Deformation
Video
Deltas out of tolerance
8.7 fps
Field Status
System Status
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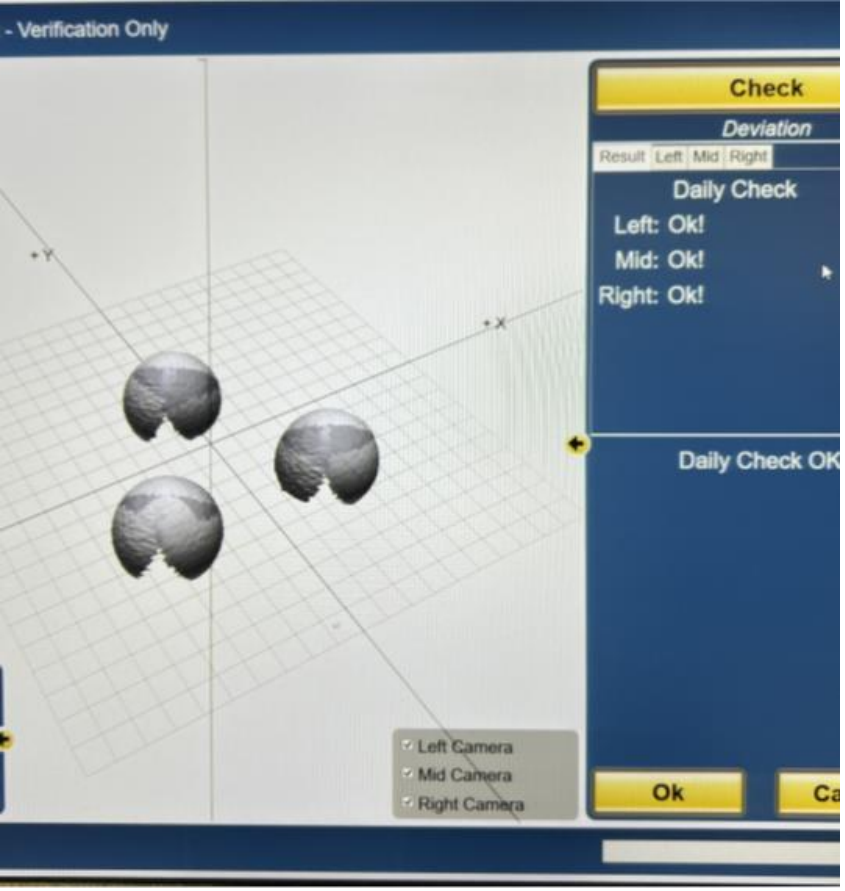
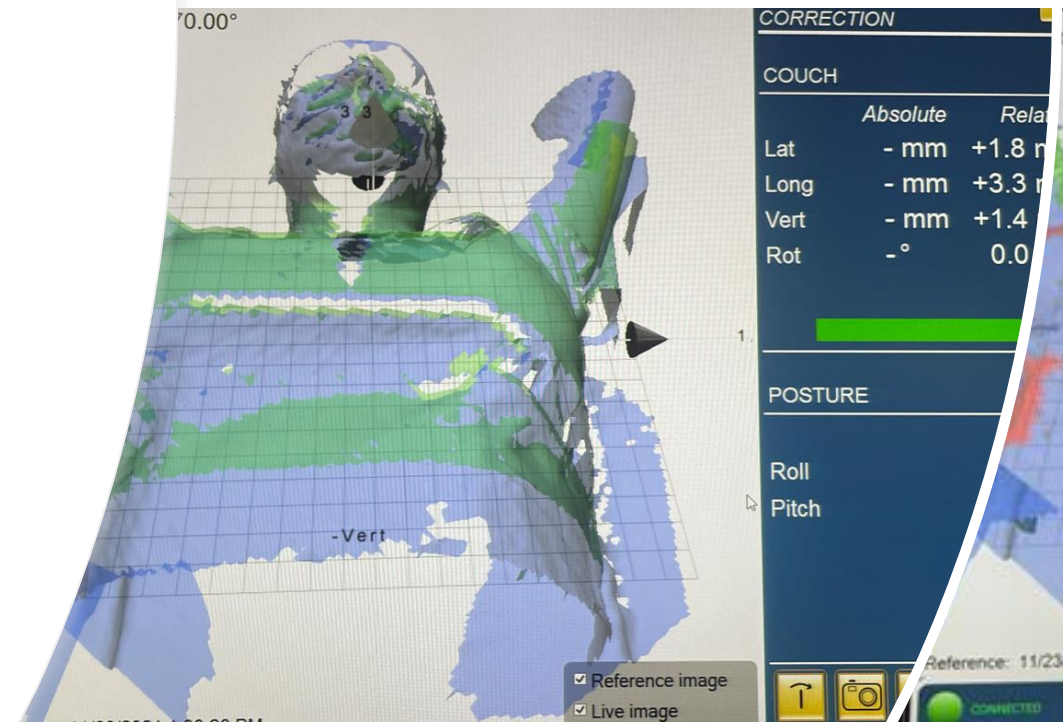


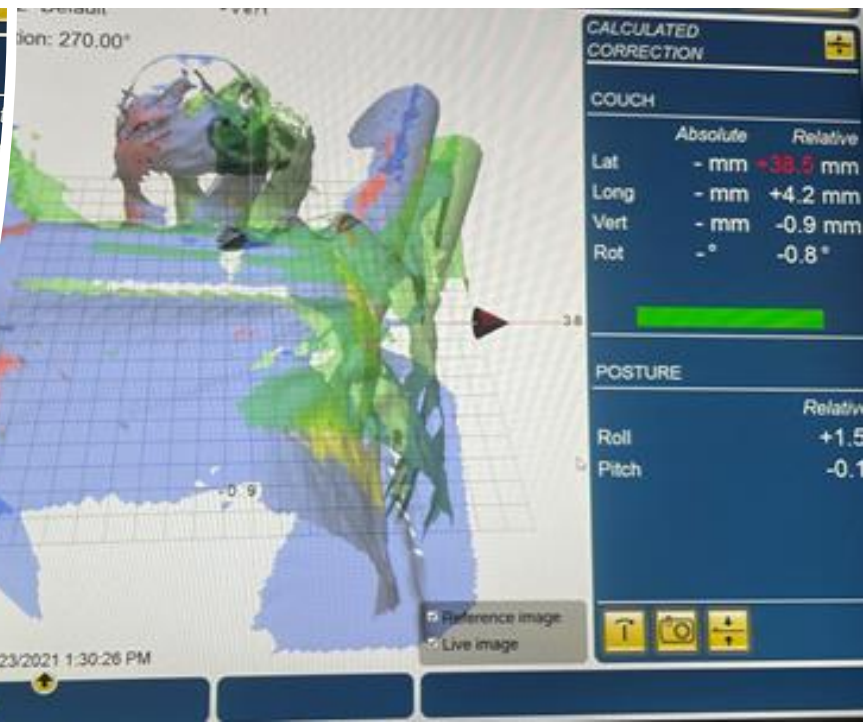
C Rad: Daily QA

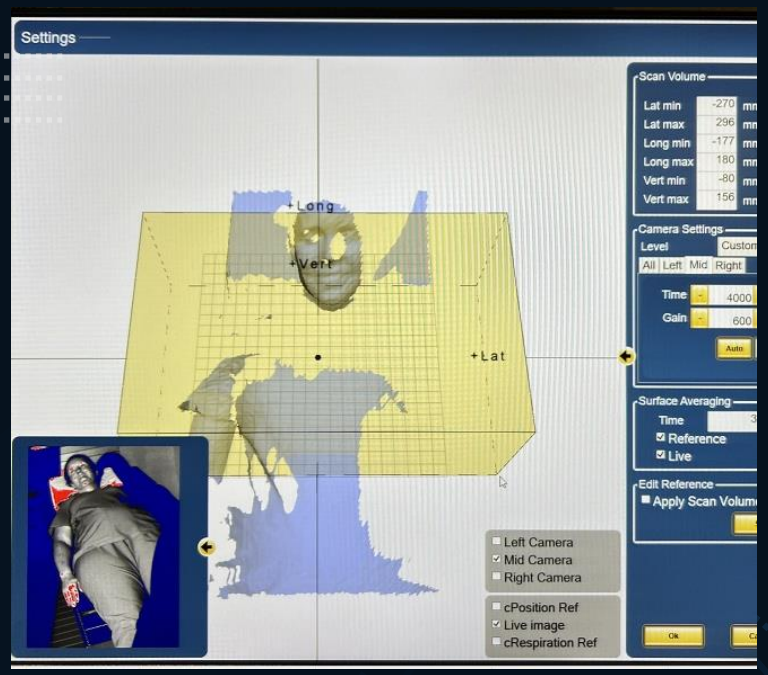
- QA is very efficient and quick.
- Place the phantom on the table and move the table to a preset position.
- “Check” the measurements.
- If there is an issue it will identify which camera is off so that physics can trouble shoot.

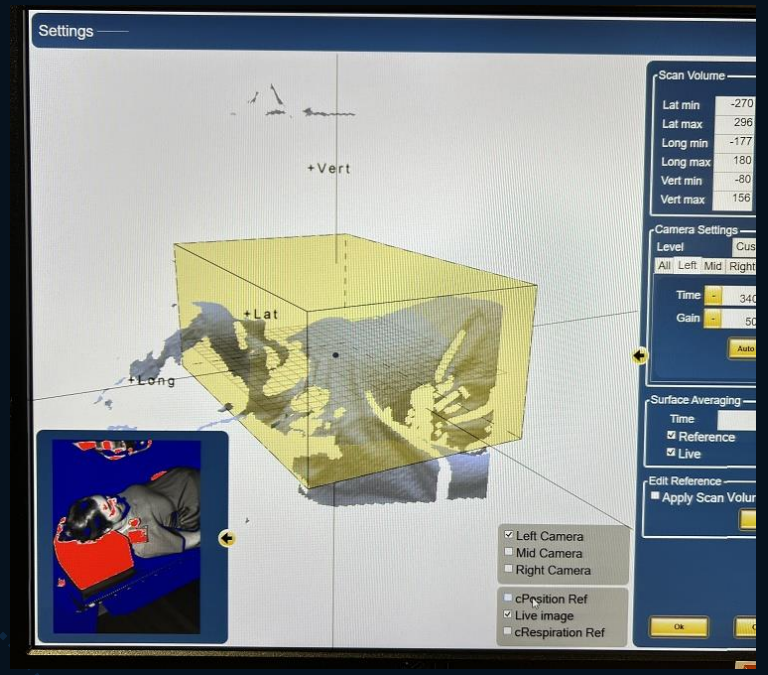
C-Rad

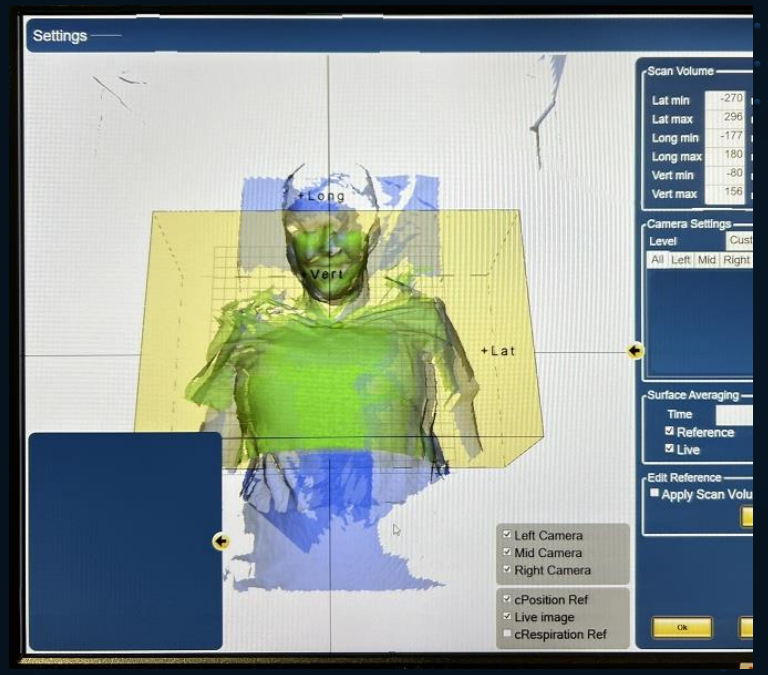
- Offered realtime patient positioning
- Morning QA is very quick
- System had a lag between moving the patient and the system updating after the move.
- We adjusted the way the ROI's were drawn and C Rad also worked on updates for us.
- Customer Service has always been kind and attentive





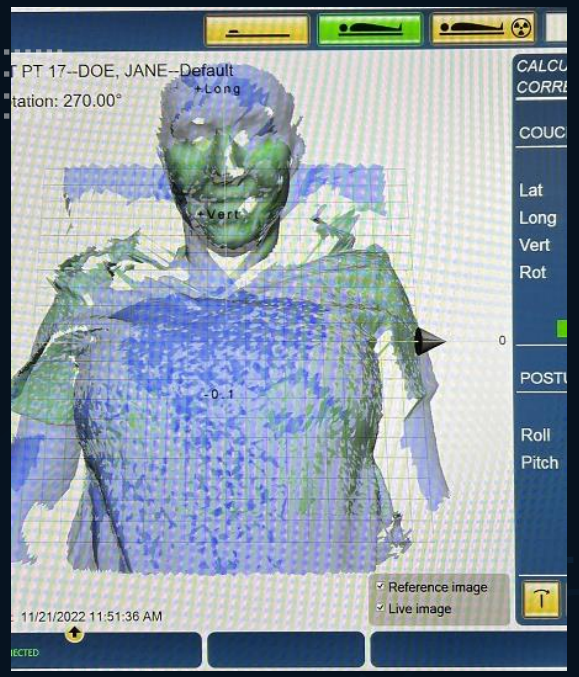


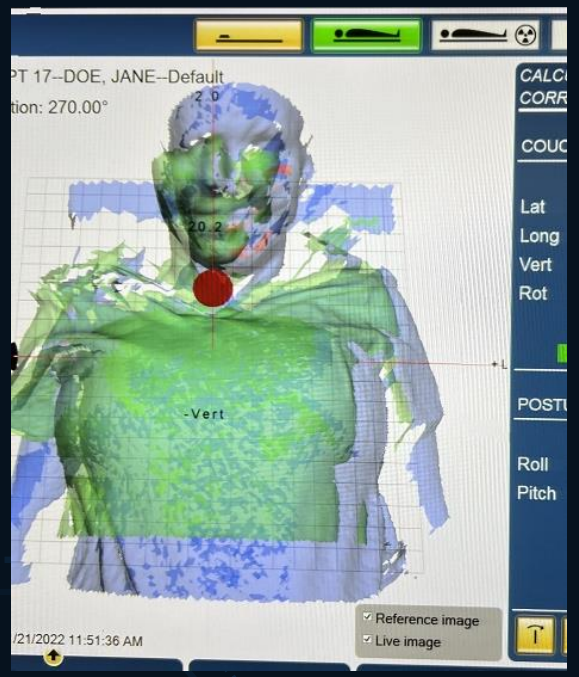


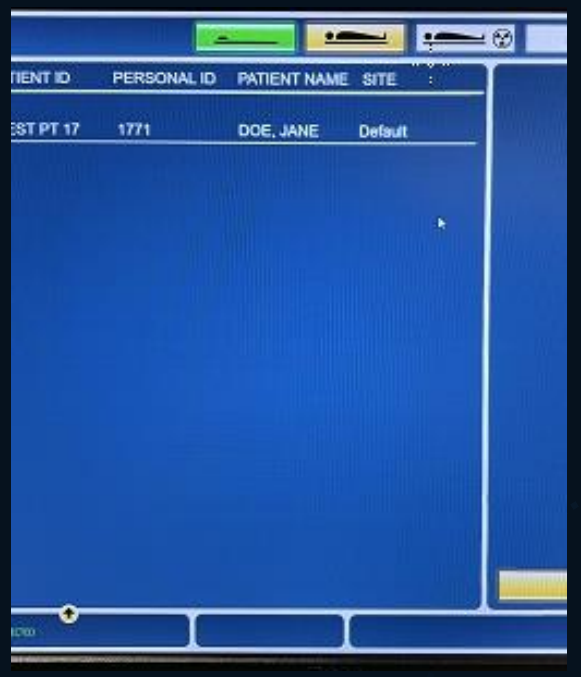


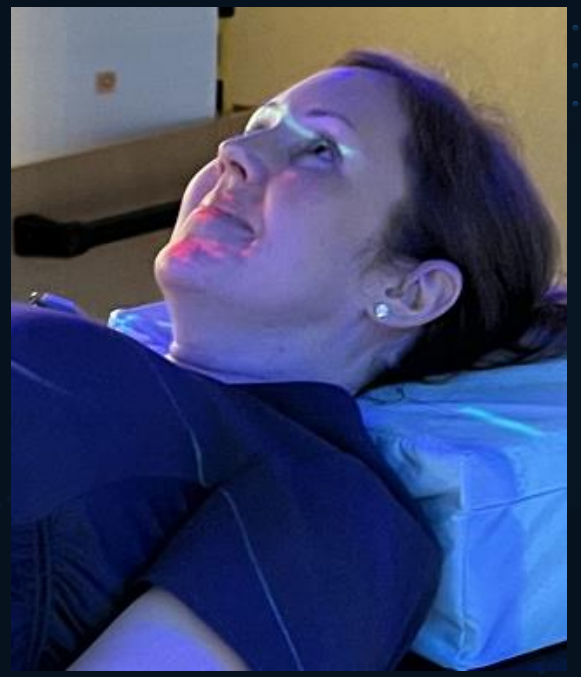
C Rad: Patient's First Day of Treatment

- Before the patient arrives, the therapists import their file
  - This takes approximately 5 min and is 4-5 steps depending on the site being treated.
- When the patient arrives, they double check the yellow box around the patient
- Adjust the time and gain-this cannot be done before hand. It is dependent on the patient's skin tone, and any mask/mepitel that may be in place.
  - This can add approx. 5-10 minutes on the first day.



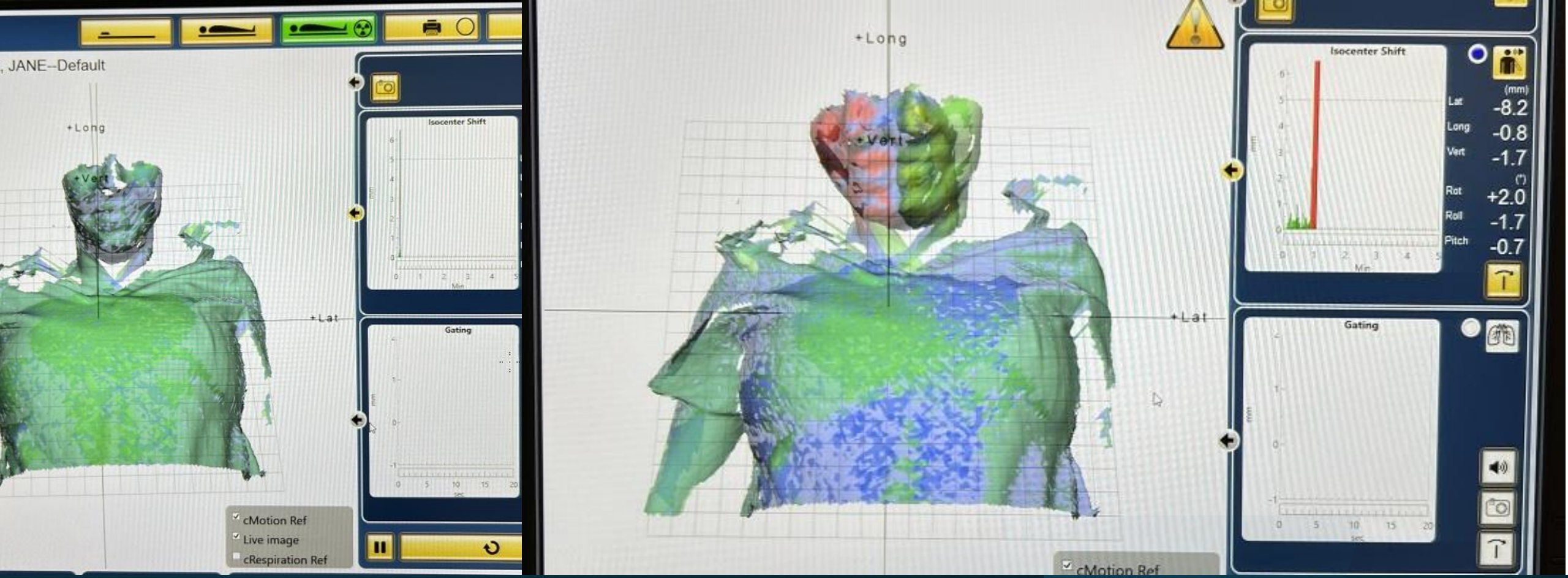




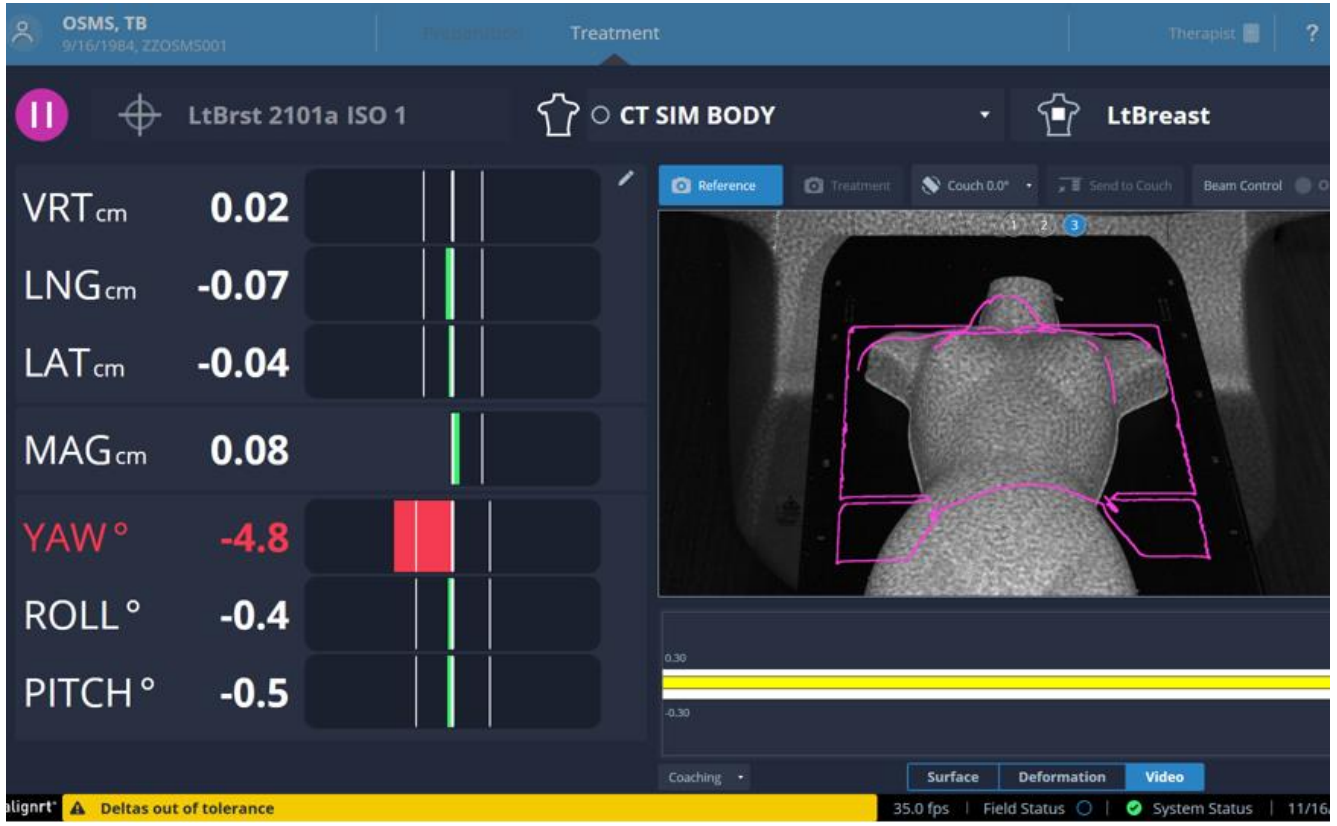


C-Rad Setup and Treatment

- Pt Selection Tab
- Setup Tab
- Treatment tab



C-Rad Setup and Treatment Cont.



The Issues of Two Systems

- Double training for staff
- Refresher needed when rotating to the other side/Loss of skills when rotating away for their current side
- Maintaining two contracts and updating two systems.
- We were deciding to expand SGRT to all four of our Proton rooms, but what vendor would we go with?

Staff Feedback

	C Rad-Protons-1 system	Vision RT-Photons-4 systems
Daily QA	3-5 min	3-5 min
Patient Importing	Easy, 5 min/ 4-5 steps depending on site. Cropping can be very tedious	Easy, 5 min-Cropping is very easy
First day with patient on table	Takes an extra 10 min the first day to verify initial Time/Gain settings and adjust ROI	Able to do a lot ahead of time without the patient on the table-No longer add extra time for first day
Daily Utilization	User friendly-but there is a lag after moving the patient and needing to wait for the system to update before making another adjustment-10-25 sec	User friendly and efficient, worked well for patient positioning. No lag after adjusting a patient. Do need to have small ROI
Does it save or add time	Site dependant-CSI it saves time and reduces X rays. Other sites it can add a couple of minutes.	About the same amount of time or saves time. Helps us to get closer to the correct position than using tattoos
Able to go tattoo less	Protons-yes if we have a system in all four rooms.	Photons has started to go tattoo less due to having a system in each room
Per the Treating RTT's on each side, which system offers the most benefit and would they like to see on both sides?	Drum Roll Please	.....


AlignRT!!!!

Staff Involvement and Training

From C Rad to Vision RT

We decided to install Vision RT into all 4 gantries

- Started with the 3 rooms that did not have C Rad.
- After the commissioning and training of the first three, we changed out the 4th room to Vision RT.
- Went live with Vision RT in April 2024.

Our SGRT use at the time of using C Rad consisted of breast and CSI treatments only.

- This was due to most sites utilized a mask, including a full-face mask for Brains and H&N's.
- Long delays after moving the patient for the system to update on the patients positioning.

Staff Input

We wanted to ensure that our therapists had a voice in the implementation of Vision.

We had a total of 5 super users

Sent all Superusers to the training in New Jersey

Held regular weekly meetings with the staff and superusers

- Superusers collected feedback from the team

Regrouped and got their input for what sites they wanted to start with, and the physician and physics teams were supportive of our plan.

Tiny steps or BIG steps?

When we started with vision, we had a basic understanding of how SGRT worked but were still hesitant.

We started with Breast, Prostate and CSI cases

- Breast and Prostate were maskless
- CSI only had a head mask, and we wanted to use Vision to help straighten the spine before imaging.
- Most other cases were in a mask, but if we had more cases without a mask, we would have jumped all in!

Open Face Masks

Open face mask evaluation.

10 long masks, 11 short masks

Retrospective analysis looked at the number of re-setups, replans, setup issues and image guidance shift information.

Physics determined that only the lateral shifts on Open v. Closed **long** masks were statistically significant / different with a p value of 0.02.

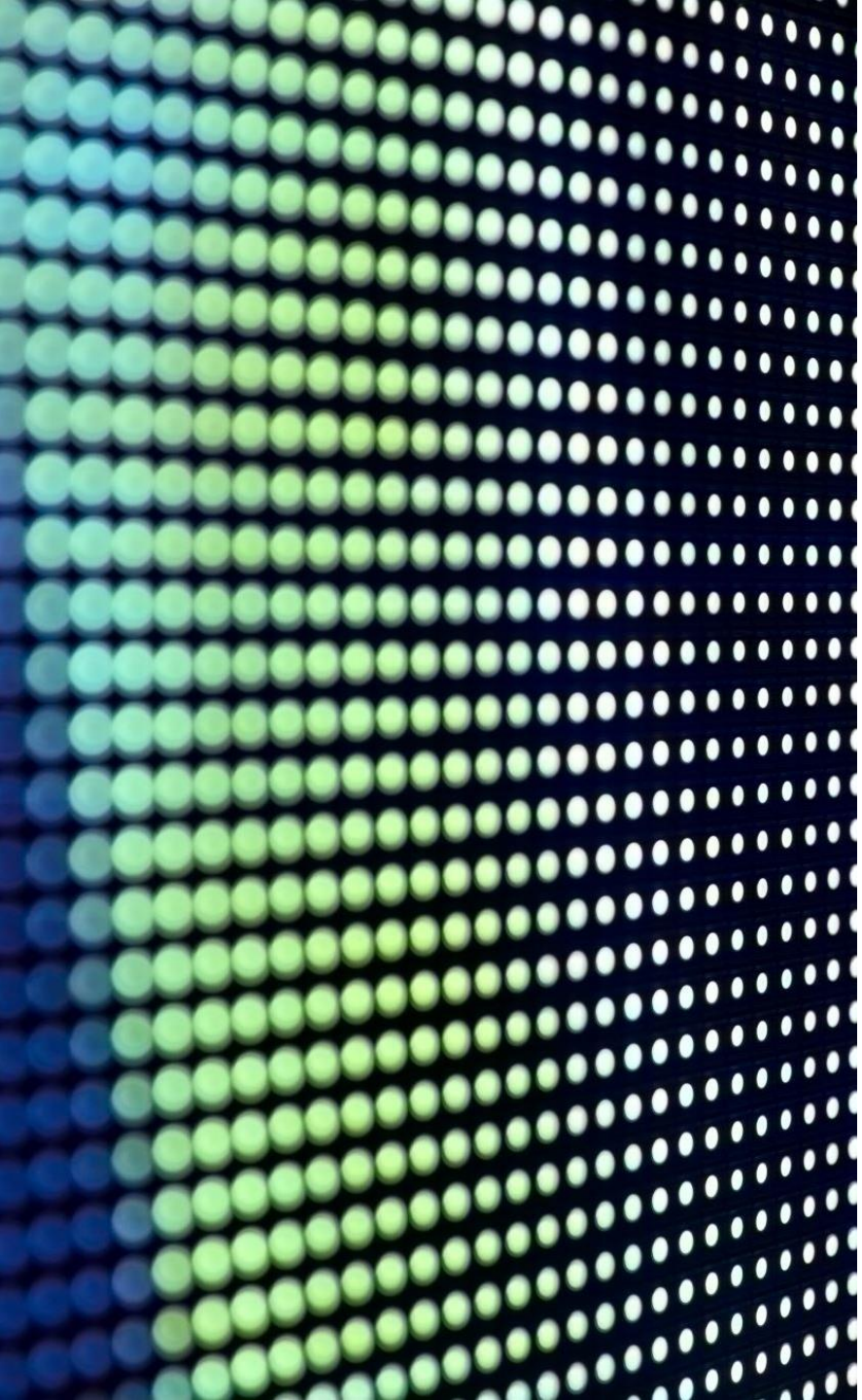
After the evaluation was complete the physician group agreed to transition to the open face mask with the exclusion of Paranasal Sinus and Chordomas.

Advanced Techniques and Future Goals

Tattoo-less

The next step was the discussion of going tattoo-less

There was a push from the physician breast and prostate groups to go tattoo less, but they were very supportive on waiting for us to be confident in our skills first.



Tattoo-less Sites at Mayo AZ

Photon Breasts- 7/2022

Photon Lung and Esophagus- 10/2022

Photon Thorax region, standard spine, abdomen, pelvis and prostate began 3/23

- Exclusion SBRT cases with a mask, prone rectum with a mask, extremities

Proton Breasts-1/2025

- Excludes bilateral Breasts due to mask

Proton Prostate began 1/2025

Tattoo-less Workflow and Contingency Plan

Photon/Proton Breast Simulation Workflow:

- Proton: Bilateral Breasts continue to tattoo levels due to mask
- Document the distance from sternal notch to CT Origin, place a BB at CT Origin
- DIBH cases: also document the distance from inferior edge of gating box to umbilicus
- Place a left/right straightening mark on the vacloc

Re-simulations, Verifications:

- If V sim is scheduled in CT Sim, treating therapists will place marks on the patient after using VisionRT and imaging.
- All VisionRT sites: mark 3-point treatment iso center
- Add lower leveling marks for the following sites:
  - Breast, Lung, Esophagus, Thorax and Spine
- Proton Breast and Prostate Vsim try to do with CToRails
  - If V sim is needed before pt starts tx, sim RTTs will utilize landmarks from sim and visually level/straighten pt.
- Sim Therapists will BB Treatment Iso marks provided by Treating Therapists.
- Document Setup and BBs placement in Journal note
- BB(s) placement on treatment iso center

Vision RT System Inoperable for Treatment Day:

- *Photons Only-Inactivate VisionRT for Photon patients to proceed with guides below*. ***This does not apply to protons.***
- Supine Breast
  - 1st treatment
    - Photons- Use sternal notch measurement to CT Origin, set sternal AP SSD per plan, shift laterally per plan, verify AP Iso SSD. Image Patient for setup verification
    - Protons-Visually straighten pt and turn chin, Go to Table parameters and image patient
  - Subsequent treatments
    - Photons-In treatment room, drive couch to acquired couch parameters, then set Treatment ISO SSD. Image Patient for setup verification
    - Protons-Visually straighten pt and turn chin, Go to Table parameters and image patient

What's next???

- We are still imaging at every couch kick.
  - ➢ Implement an evaluation of how often we apply shifts after imaging at each couch kick.
- Utilize AlignRT for all patients, including masked patients.
  - ➢ This would help to reduce imaging, Increase accuracy and patient satisfaction.

Acknowledgments

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BREAK