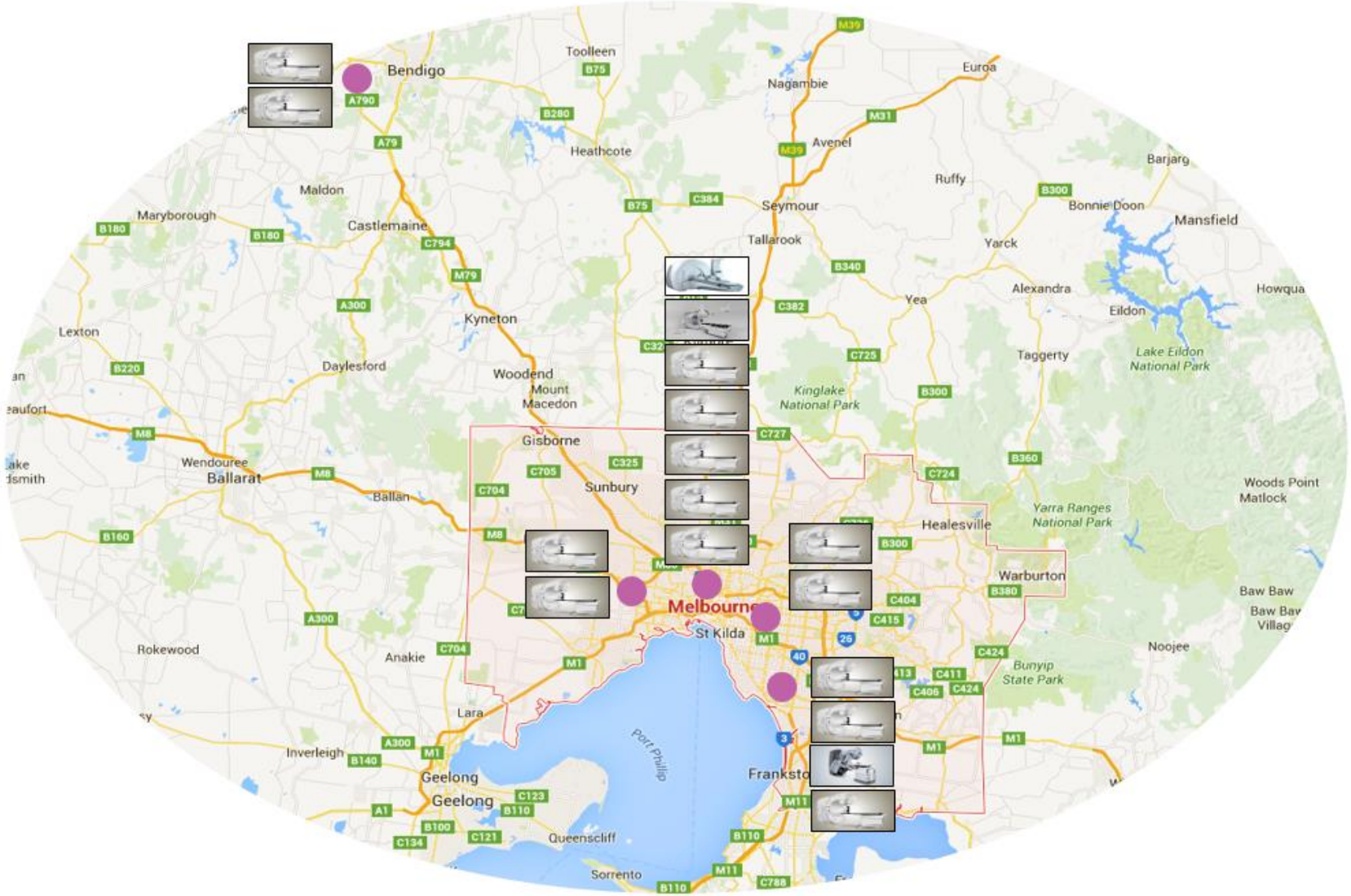
Peter Mac's SGRT Adoption:

Redefining our Vision for Radiation Therapy

Karen McGoldrick and Kenton Thompson

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

PETER MAC



8000 courses annually
16 Varian Linacs
11 AlignRT Advance
1 GammaKnife
Brachytherapy
Varian Eclipse
Brainlab Elements
Leksell GammaPlan
MOSAIQ
6 Phillips CT
1 Siemens CT
1 MapRT*

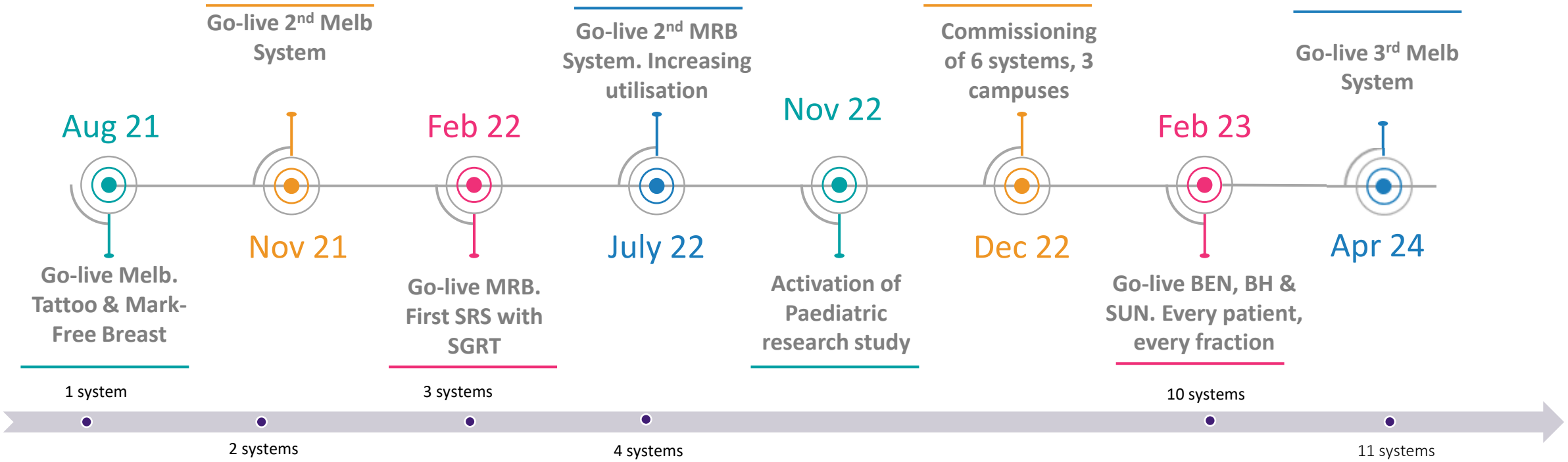
Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

PMCC VISION FOR SGRT

Motivation for SGRT

- Better patient care - Tattoo free treatments
- Improved accuracy - Intra-fraction monitoring
- Quality Care – Paediatric – reduce need for GA

- Staged implementation via procurement within public health system



SURFACE GUIDANCE BEGINS

- August 2021
- 1st SGRT installed on our TrueBeam with 6DoF
- Installation & Commissioning included in new linac installation
- Training

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

IMPLEMENTATION – STAFF TRAINING

- Training consisted of 2 components:

a) **Online learning modules :**

- In-service recorded video presentation by AlignRT
- Online modules on VisionRT portal
- Review of additional resources on Peter Mac online learning platform (LMS)

b) **Hands on Training:**

- QA processes
- Preparation of Plan
- ROI tips
- Using phantoms to run through workflows for:

  Breast, DIBH Breast, Electrons

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

TRAINING MATERIAL

Dashboard / My courses / RT - AlignRT Training

RT - AlignRT Training

- Participants
- Badges
- Grades
- General
- Course Overview
- Vendor Videos
- AlignRT Training
- Quick Reference Packages
- Additional Resources
- Certificate of Completion

Administration

- Course administration
  - Unenrol me from RT - AlignRT Training
  - Reports
  - Grades
  - Badges
  - Switch role to...

- Course Overview
- Vendor Videos
- AlignRT Training
- Quick Reference Packages
- Additional Resources
- Certificate of Completion
- All sections

IMPLEMENTATION – STAGED CASE SELECTIONS

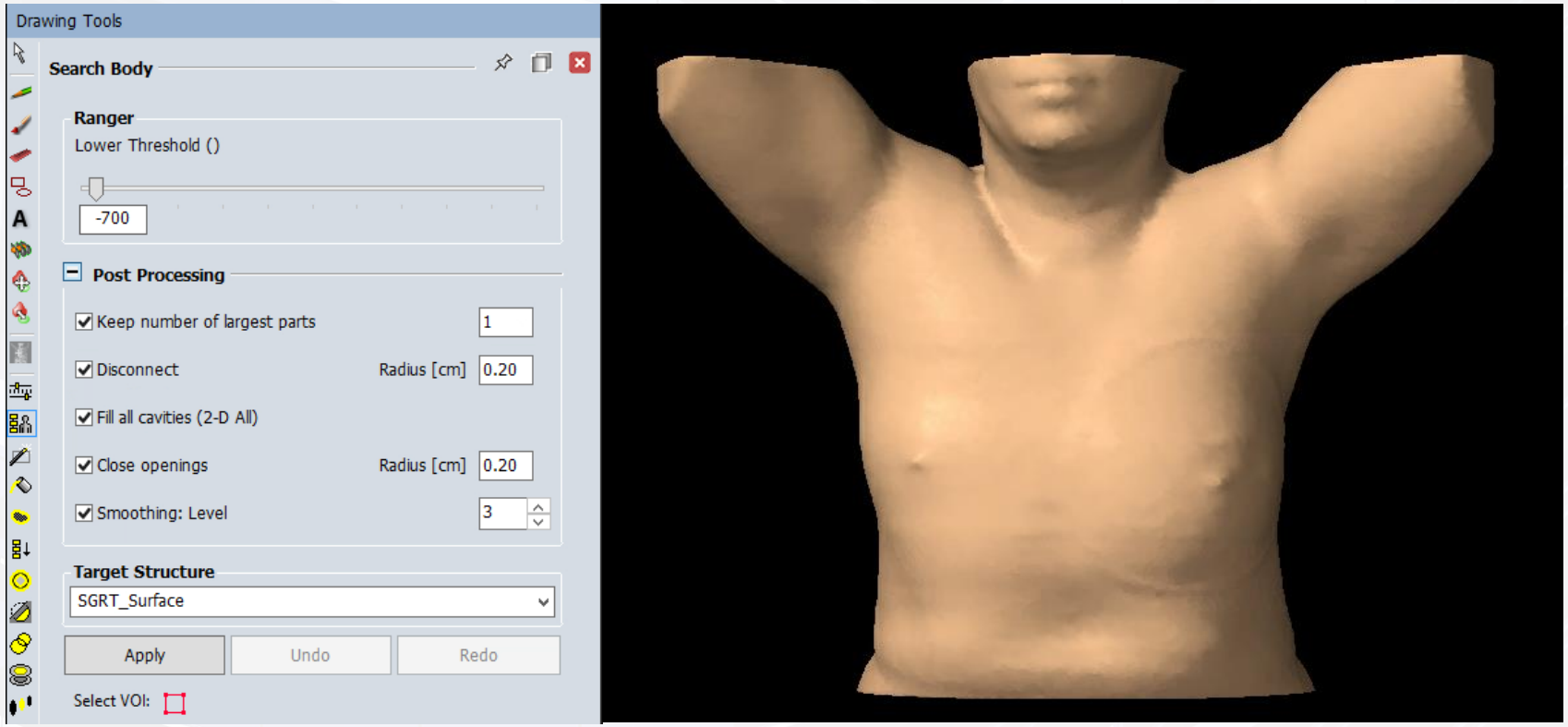
- **Late 2021 1st & 2nd Linac (Melbourne Campus)** -Priority was to treat ALL Breast patients with SGRT and treat tattoo free
- Within 1 month of Go-Live 100% of patients were treated with SGRT on this linac
- **Early 2022 3rd & 4th Linac (Moorabbin Campus)** – Priority Breast cases & offer tattoo free treatment, DIBH Haematology/Mediastinal Region, Sarcoma Extremities , Brain SRS, SABR
- **Feb 2023 – 6 additional systems (Bendigo, Box Hill & Sunshine)** -All patient treated with SGRT and tattoo free
- Excluded Radical H&N cases – due to project underway to evaluate this and not large cohort of these patients at those campuses

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

IMPLEMENTATION –SURFACE DEFINITIONS

SGRT_SURFACE

- SGRT_Surface is always the 1st reference surface to set up the patient with AlignRT
- RTs were instructed to use default Search Body settings ensuring VOI has been reviewed to cover relevant section of the patient anatomy



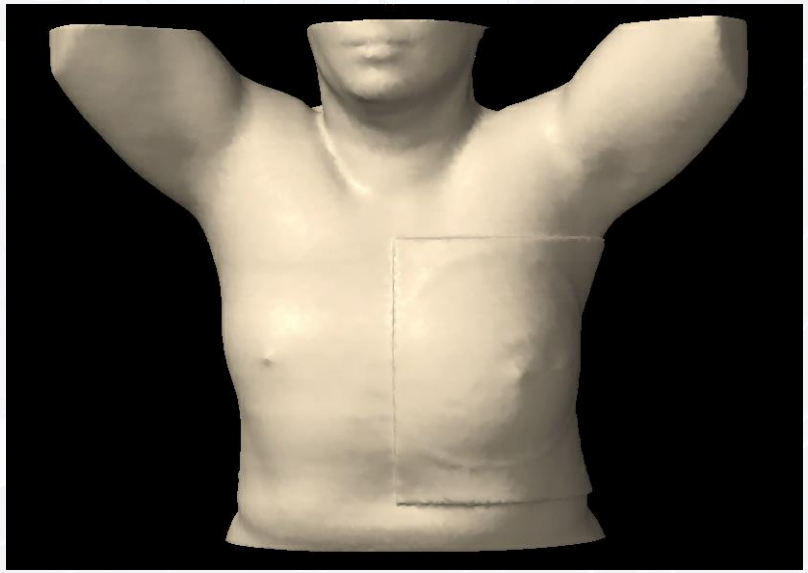
Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

IMPLEMENTATION –SURFACE DEFINITIONS

Additional structures exported to AlignRT to assist with treatment set up and delivery included:

- SGRT_BOLUS
- SGRT_BH (Breath Hold)
- SGRT_BH + BOLUS
- SGRT_ELECTRON

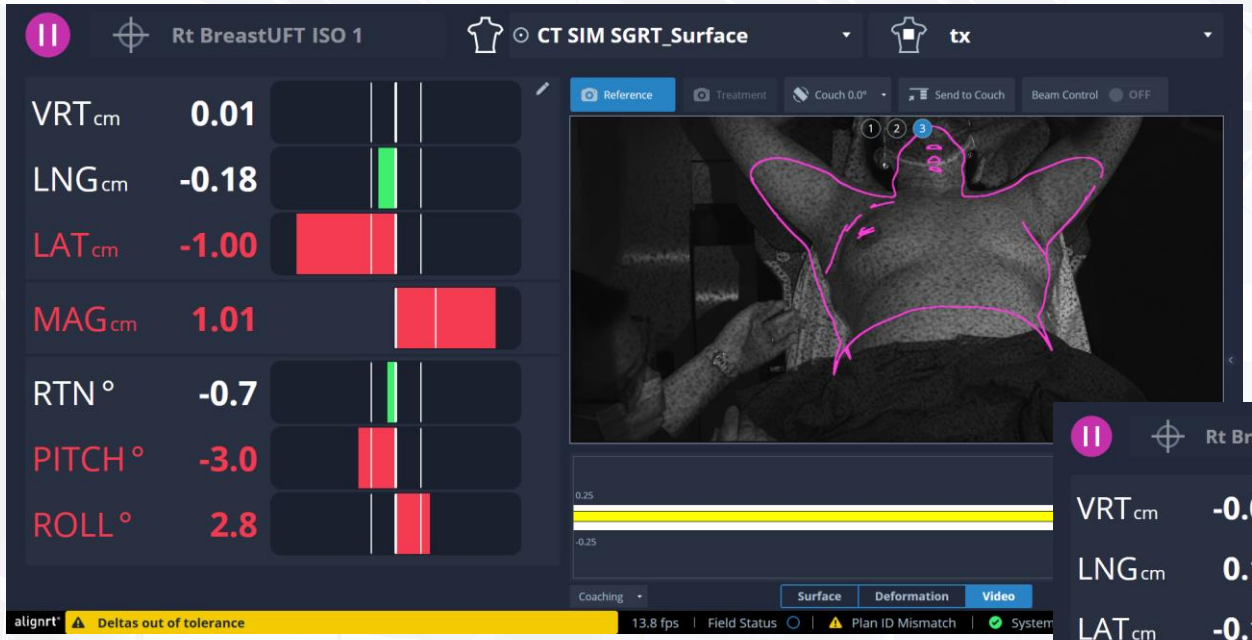
SGRT_BOLUS

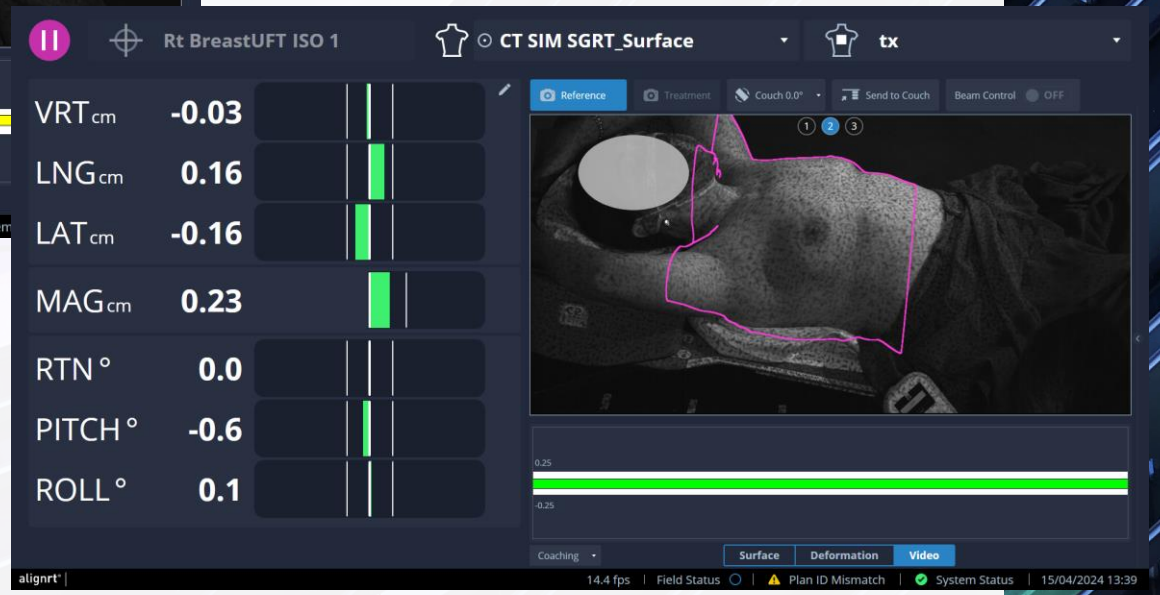


Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UTILASTION OF TOOLS

- Postural Video –improved set up prior to IGRT

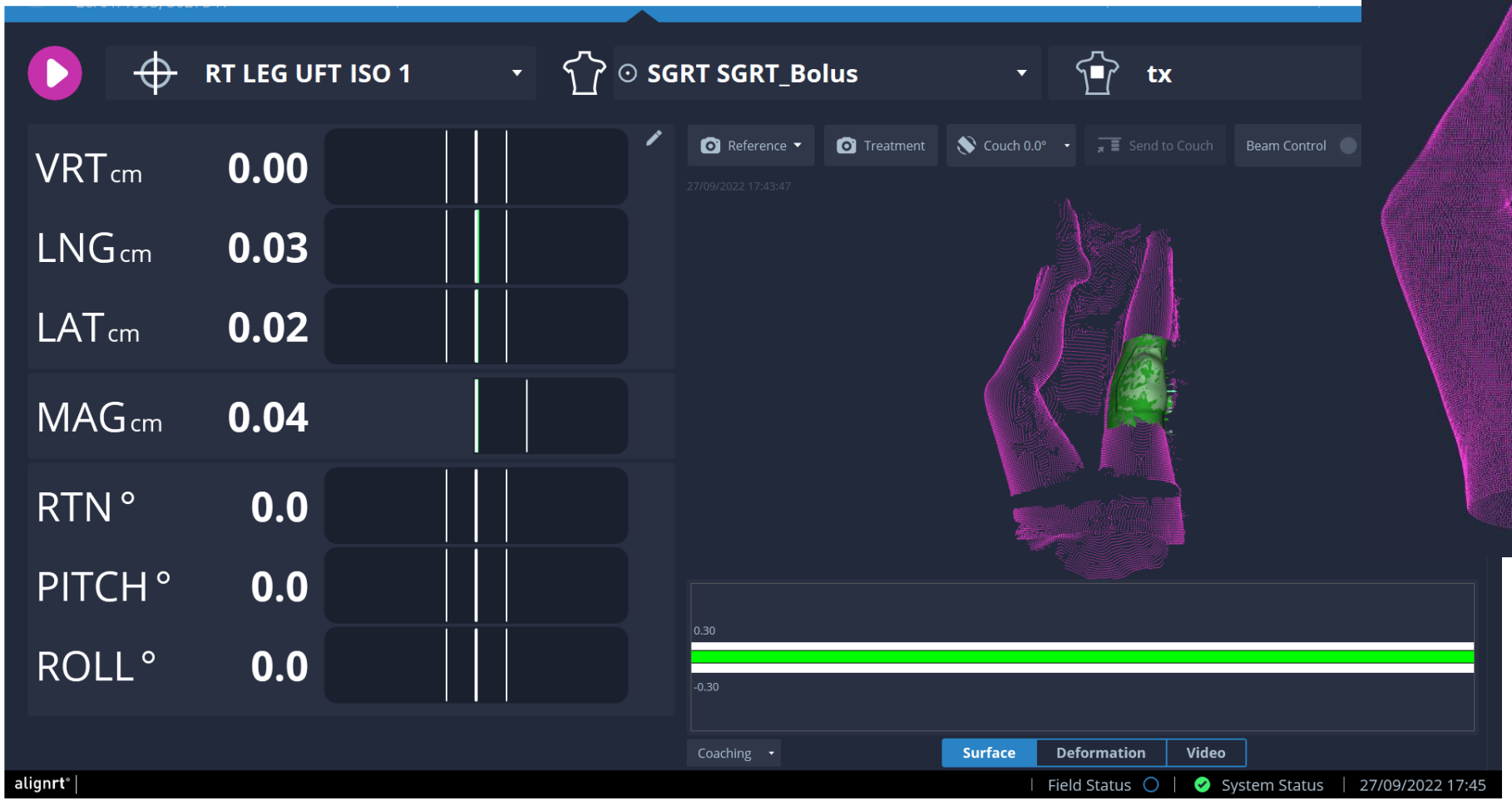


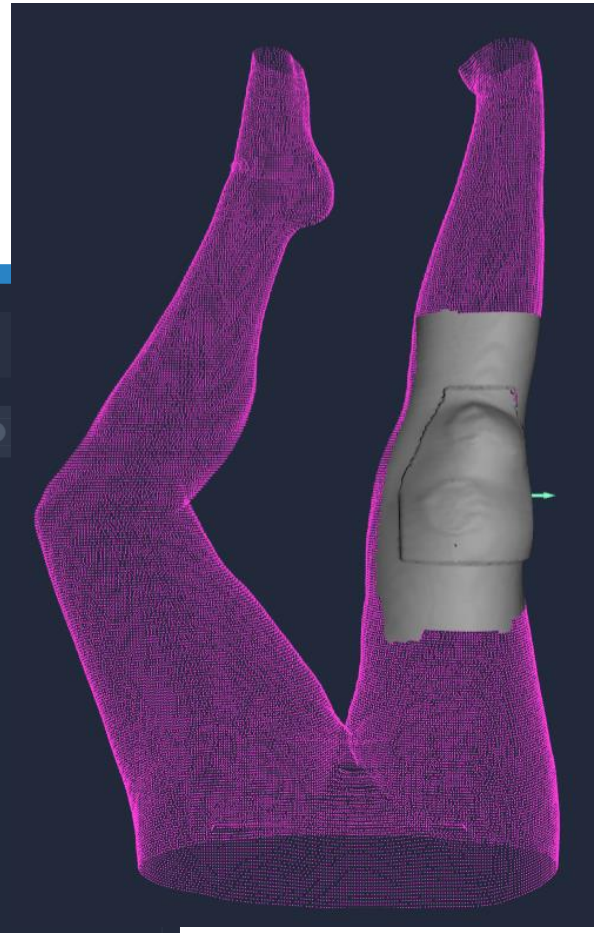


Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UTILASTION OF TOOLS

- Deformation to position bolus





Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UTILASTION OF TOOLS

- SSD Checks

SSD Measurements

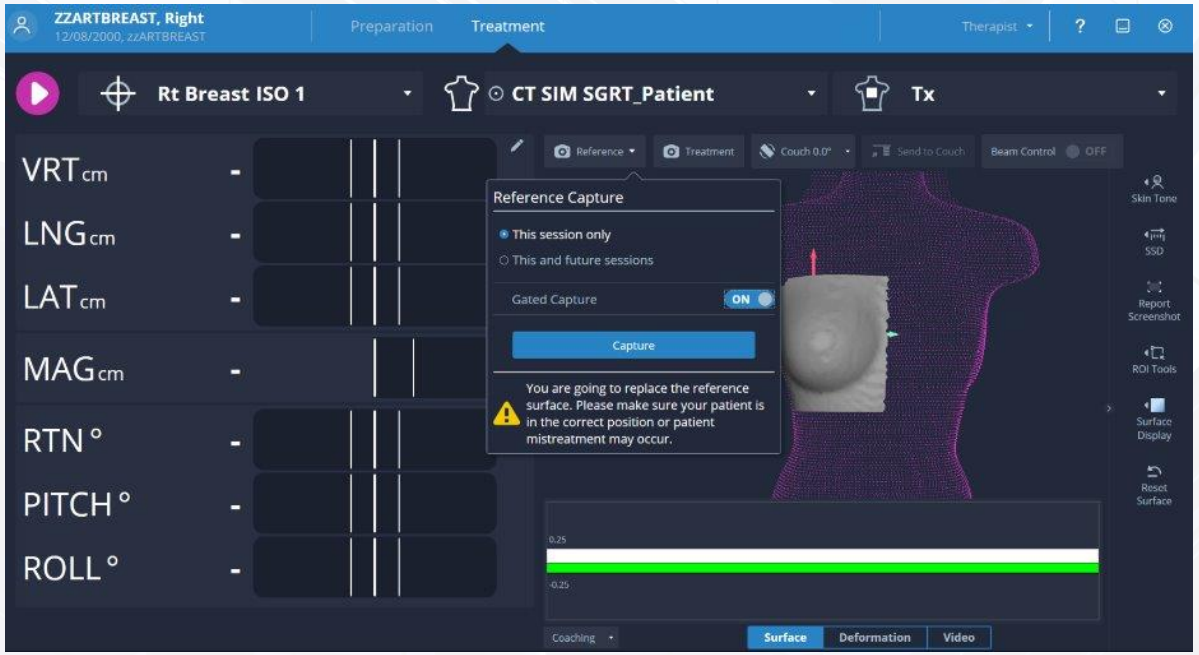
Field	Gantry	Couch	Plan	Current
01	330.0°	0.0°	90.70cm	91.44cm
02	0.0°	0.0°	93.18cm	93.78cm
03	45.0°	0.0°	93.54cm	94.15cm
04	135.0°	0.0°	90.45cm	Fail
05	165.0°	0.0°	83.85cm	86.92cm
AA	0.0°	0.0°	93.18cm	93.78cm
BB	90.0°	0.0°	92.11cm	92.64cm

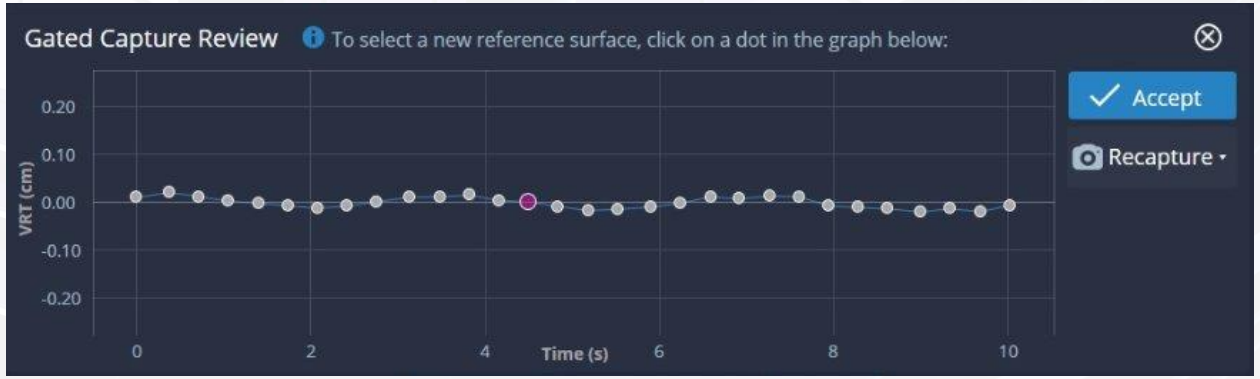
Save to Report

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UTILASTION OF TOOLS

- Gated Capture

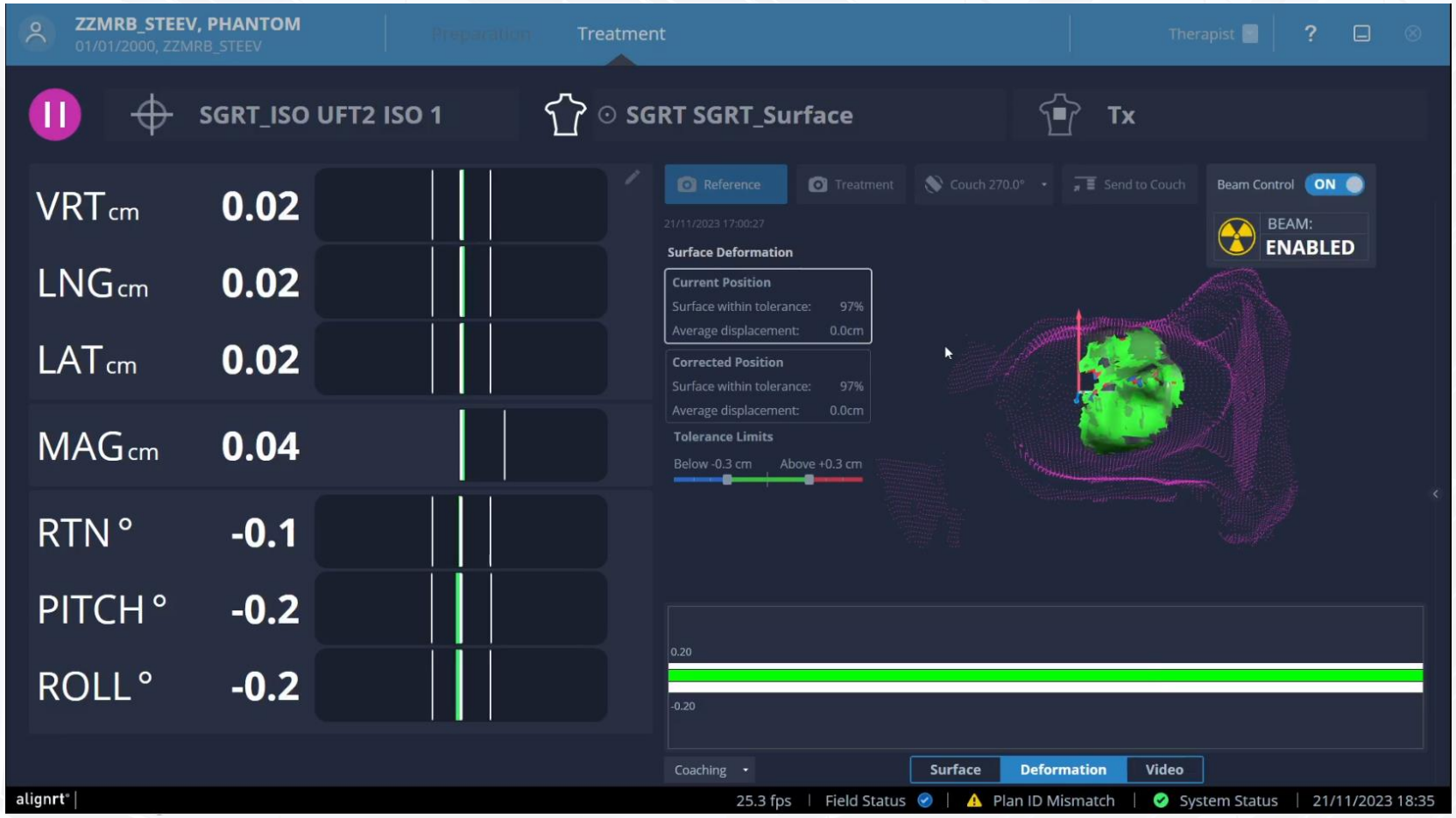




Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UTILASTION OF TOOLS

- Treat with Beam Control

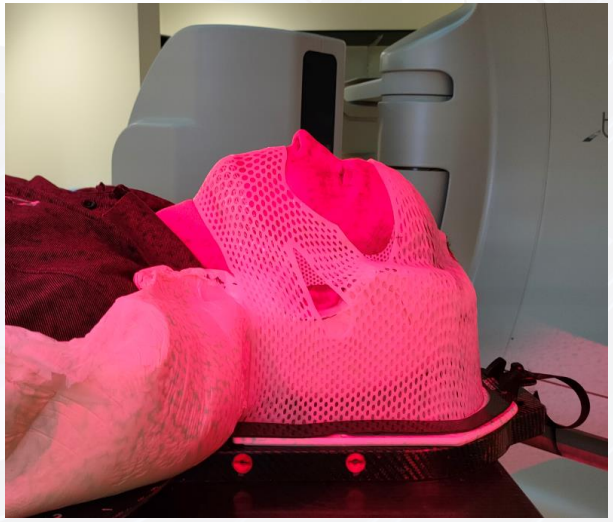


Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

BRAIN SRS – OPEN FACED MASKS

CDR™ Stabilisation:

- FreedomX board
- Personalised head & Neck foam support using intuition click
- CDR Open Faced Mask



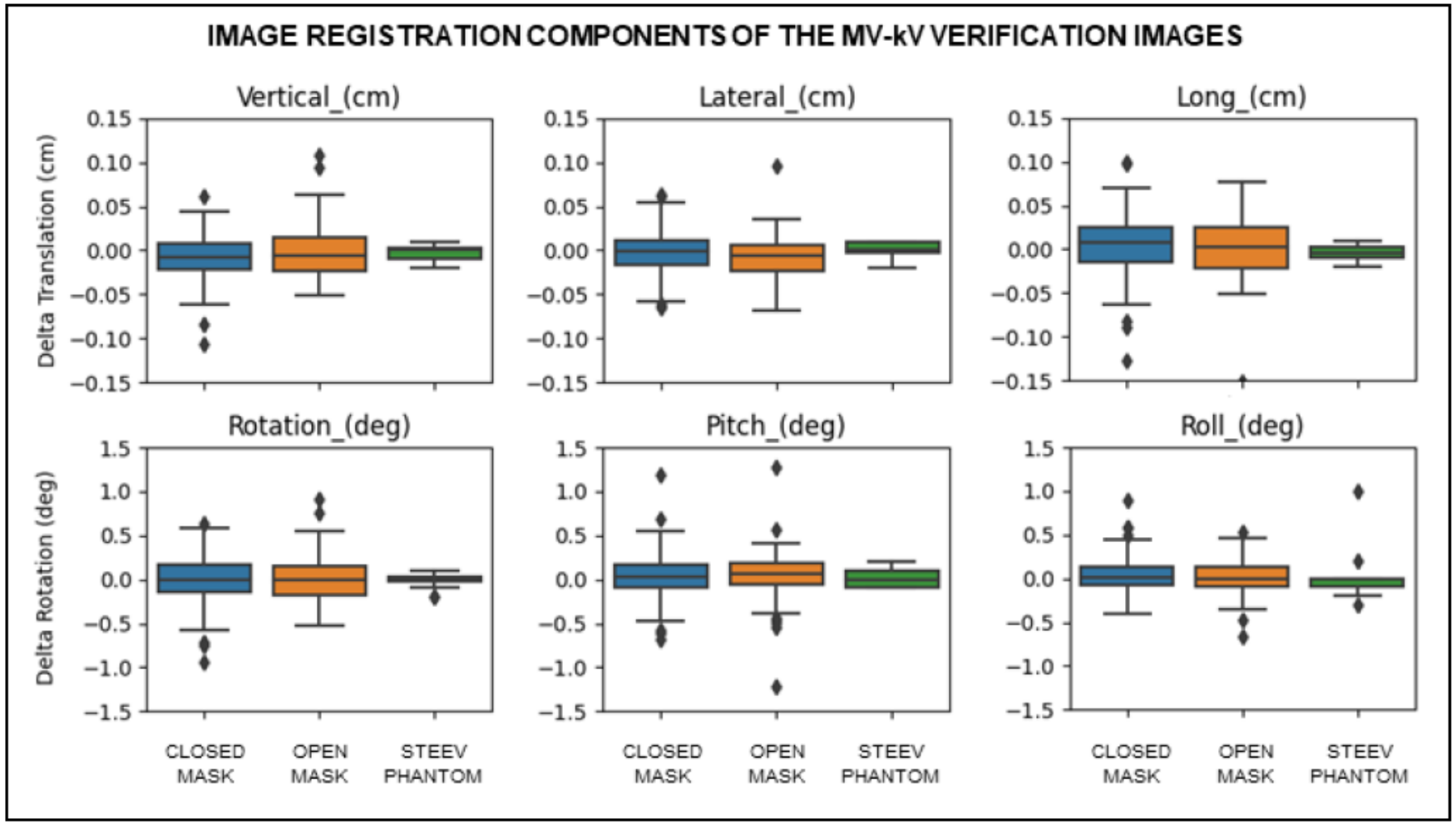
Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

BRAIN SRS – OPEN FACED MASKS

- Initial patient positioning closer to planned position
- Post CBCT Reference capture for patient monitoring throughout treament

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

COMPARISON OF INTRAFRACTION IMAGING SHIFTS FOR CLOSED VS OPEN FACED MASKS



Courtesy: J Hughes PMCC 2022

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

COMPARISON OF FREQUENCY OF INTRAFRACTION SHIFTS FOR CLOSED VS OPEN FACED MASKS

	Number of couch 45°/315° treatment angles	Repositions Required (n)	Repositions Required (%)
Closed Mask	49	31	63.3%
Open Mask	115	59	51.3%
STEEV Phantom	10	0	0.0%

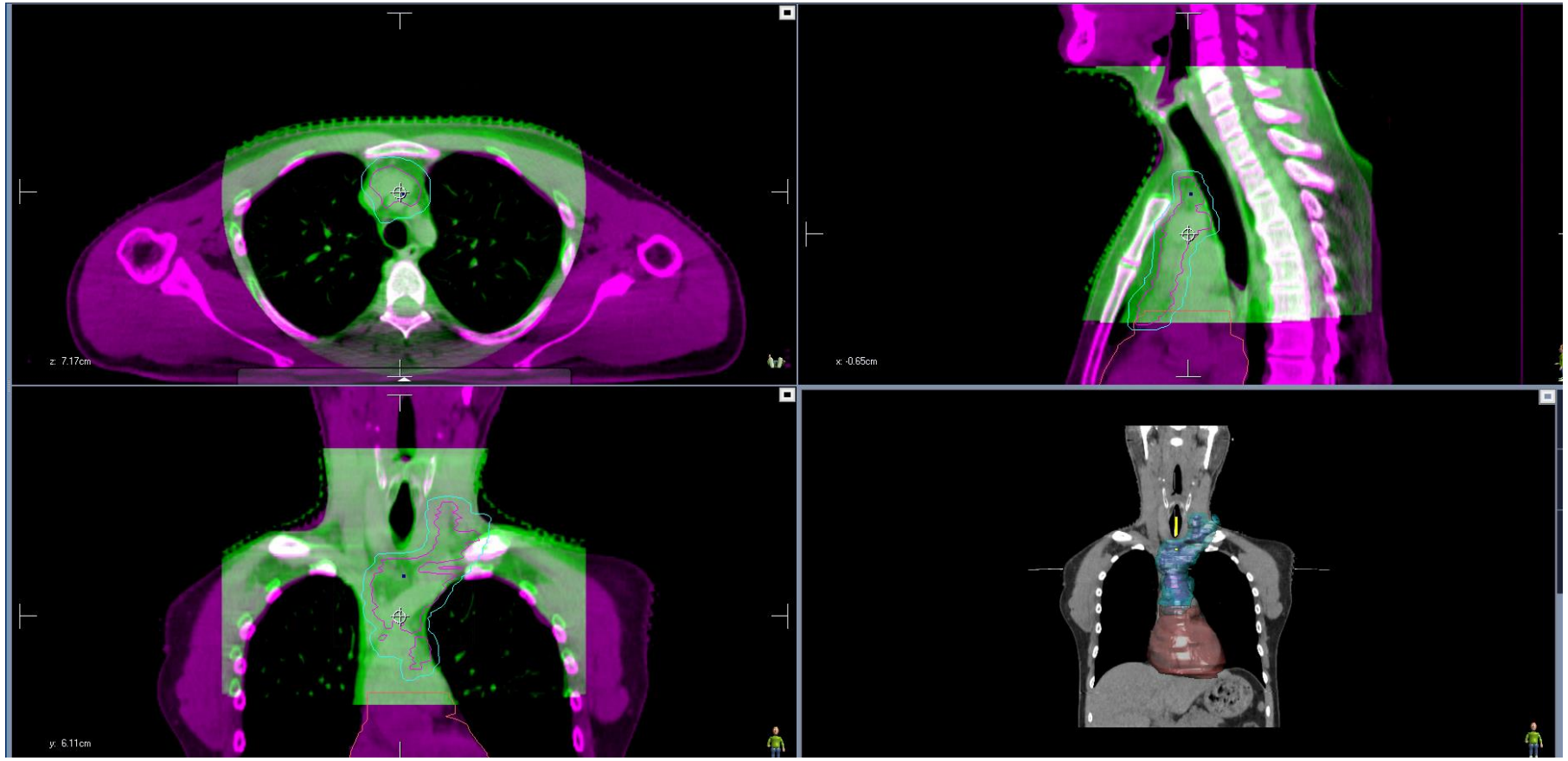
Table 1: Summary of the number of times a reposition was required at couch 45°/315°. Tolerance of repositioning was 0.05cm/0.5°

Courtesy: J Hughes PMCC 2022

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

DIBH

Using RPM & AlignRT concurrently



Advantage of RPM:

I. Able to employ Gated imaging to ensure CBCT only captured in EBH

II. Previous confidence in RPM for motion management

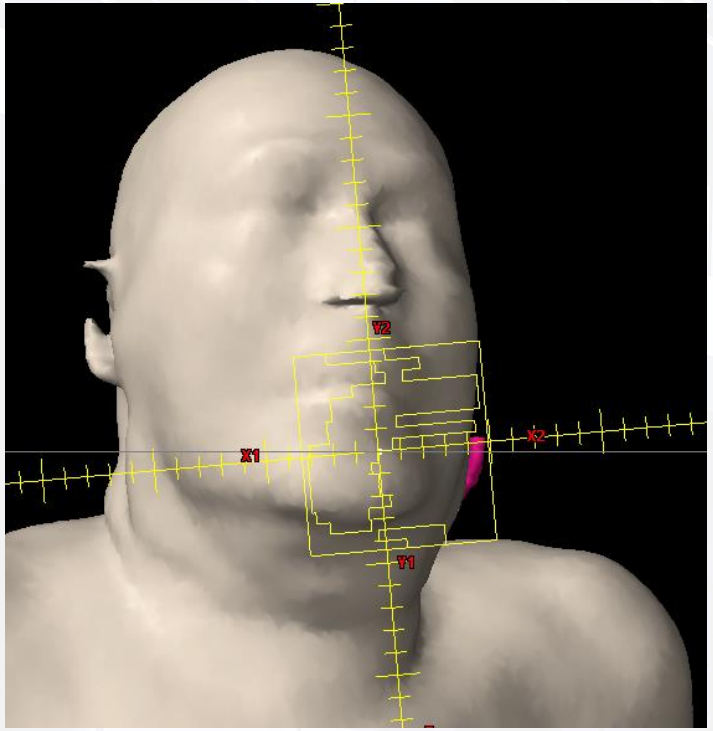
Advantage of AlignRT:

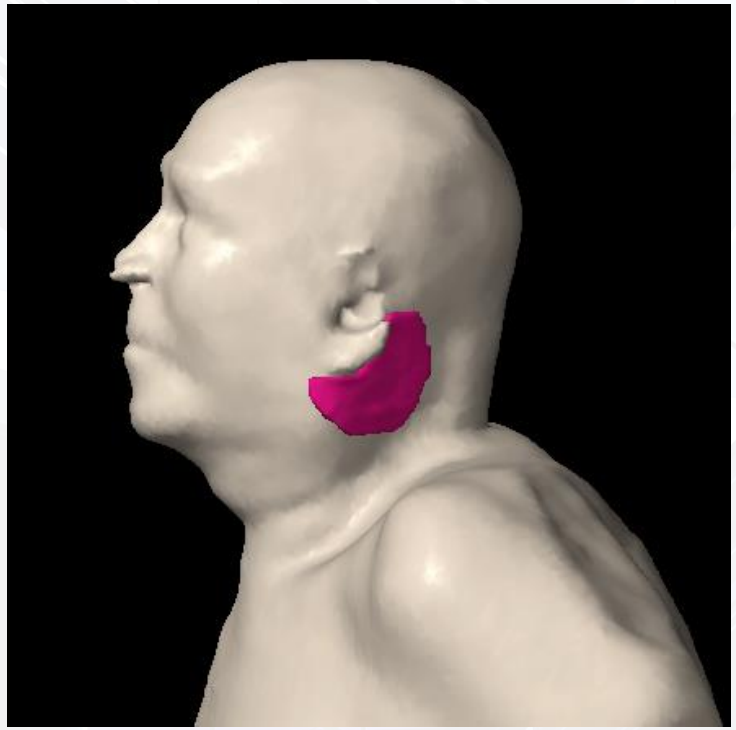
I. Increased set up accuracy prior to CBCT

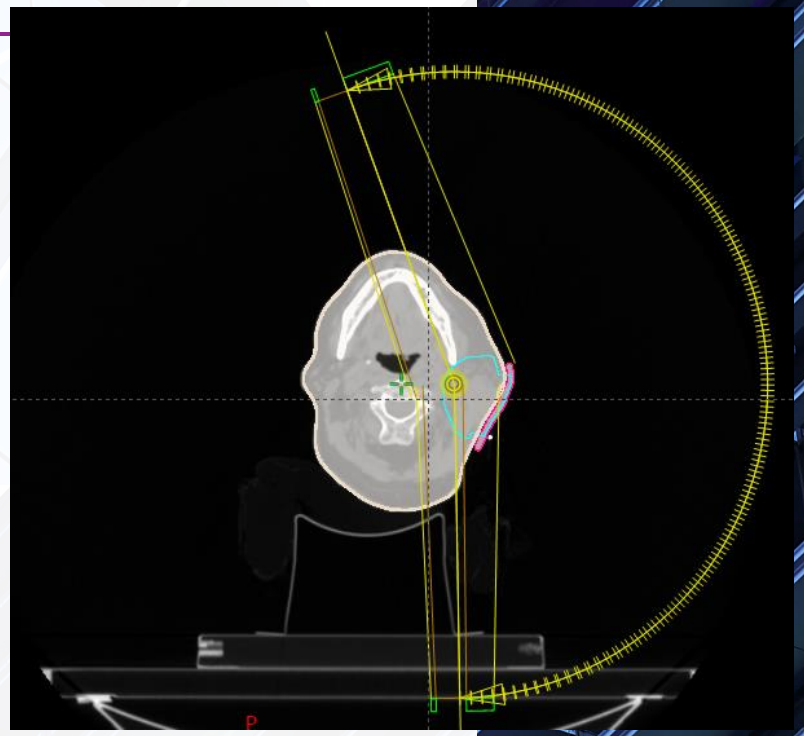
II. Surface tracking of treatment region, in this case the sternum to ensure patient position remains consistent in DIBH

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

UNUSUAL CASE – MR M - H&N WITHOUT MASK



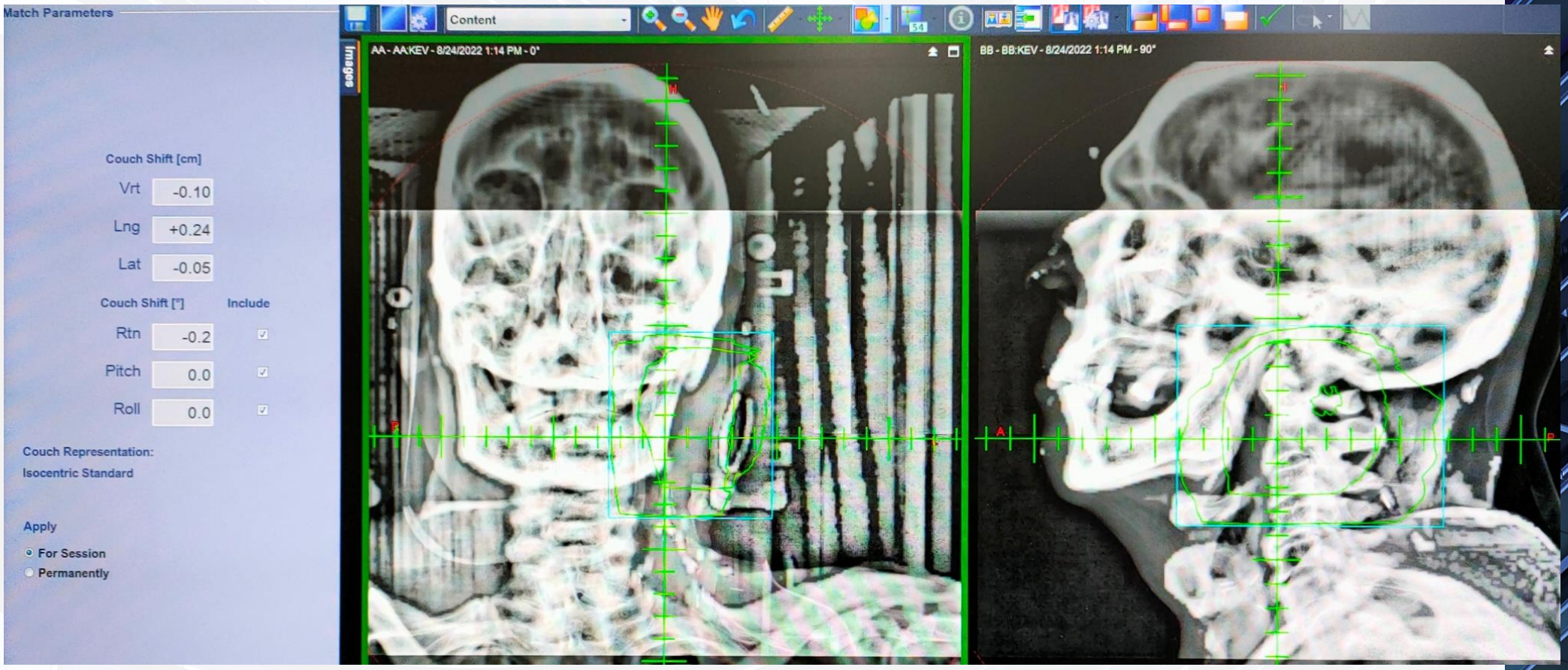




- H&N patient:
- Unable to tolerate mask, originally palliative intent
- Changed to radical does 70Gy in 35 #
- SGRT – setup & monitoring

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

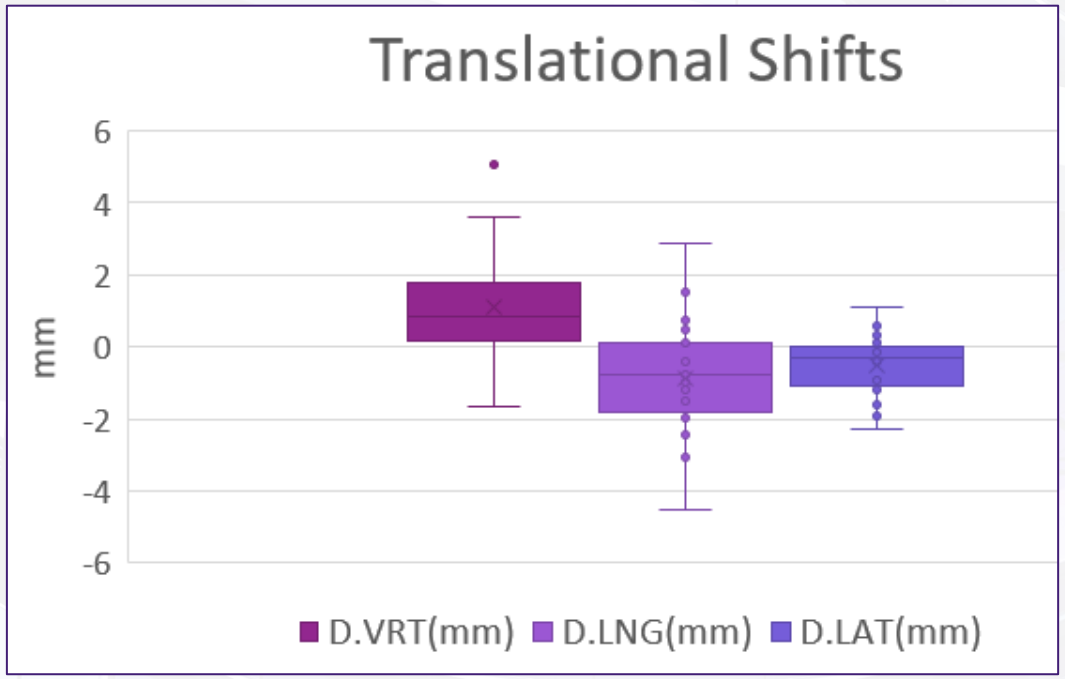
MR M

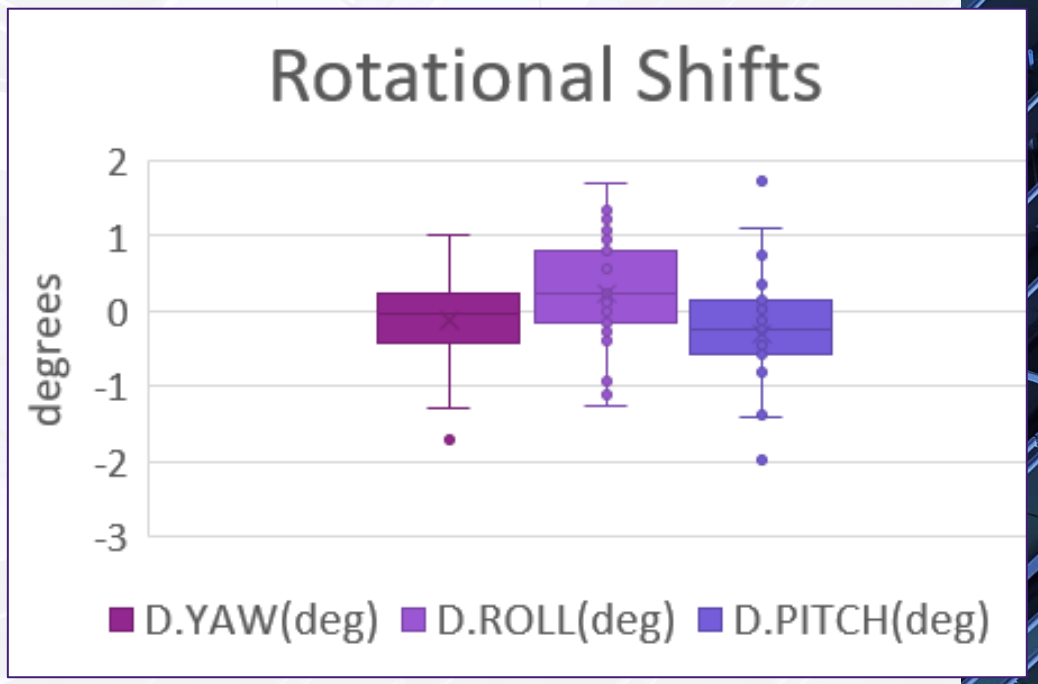


Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

MR M

- IGRT Shifts from initial Setup Surface prior to treatment





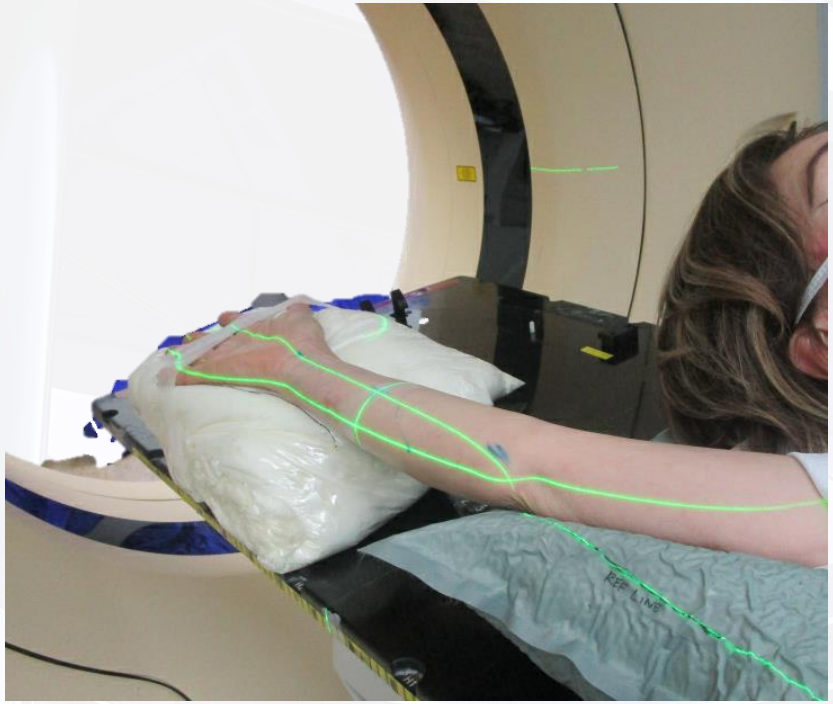
Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

MR M

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

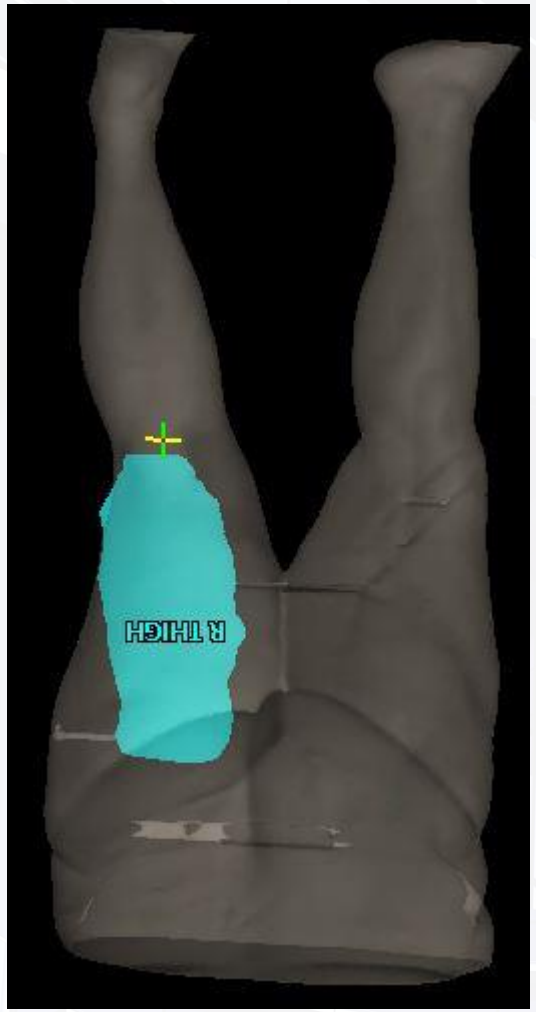
NO LIMB LEFT UNTURNED

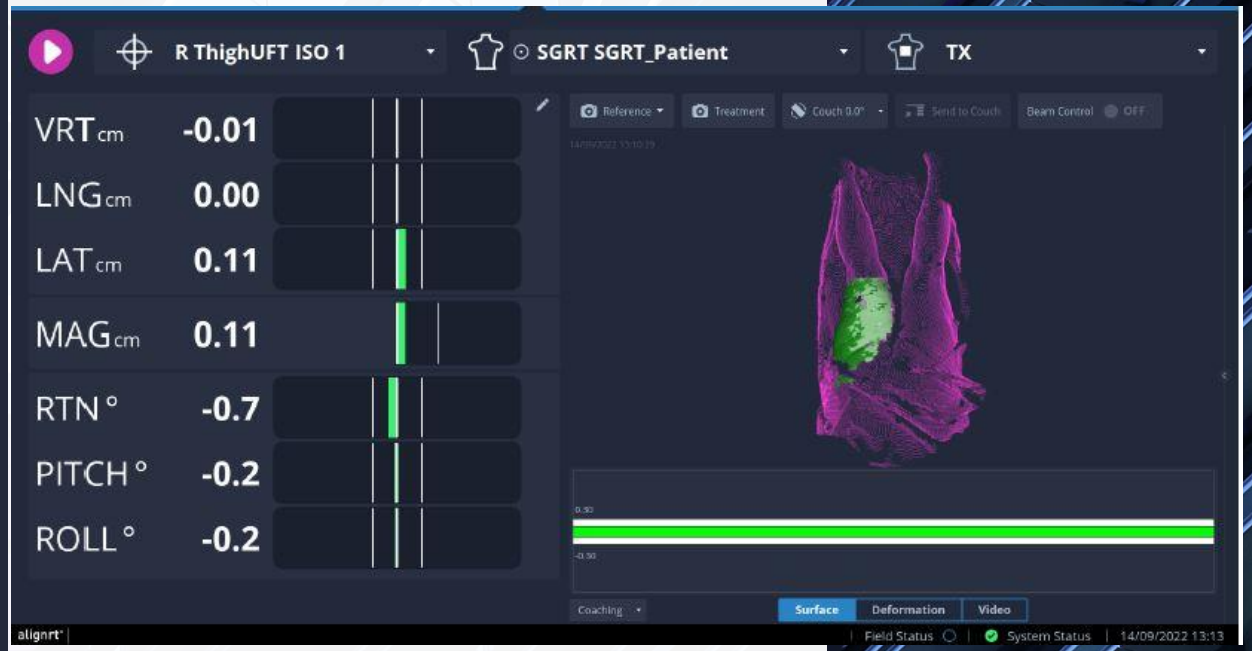
- SGRT a total game changer for managing extremities
- Enormous benefit by enabling pitch , rotation & roll to be corrected prior to IGRT
- CBCT with match using 6DoF = increased accuracy of treatment delivery



Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

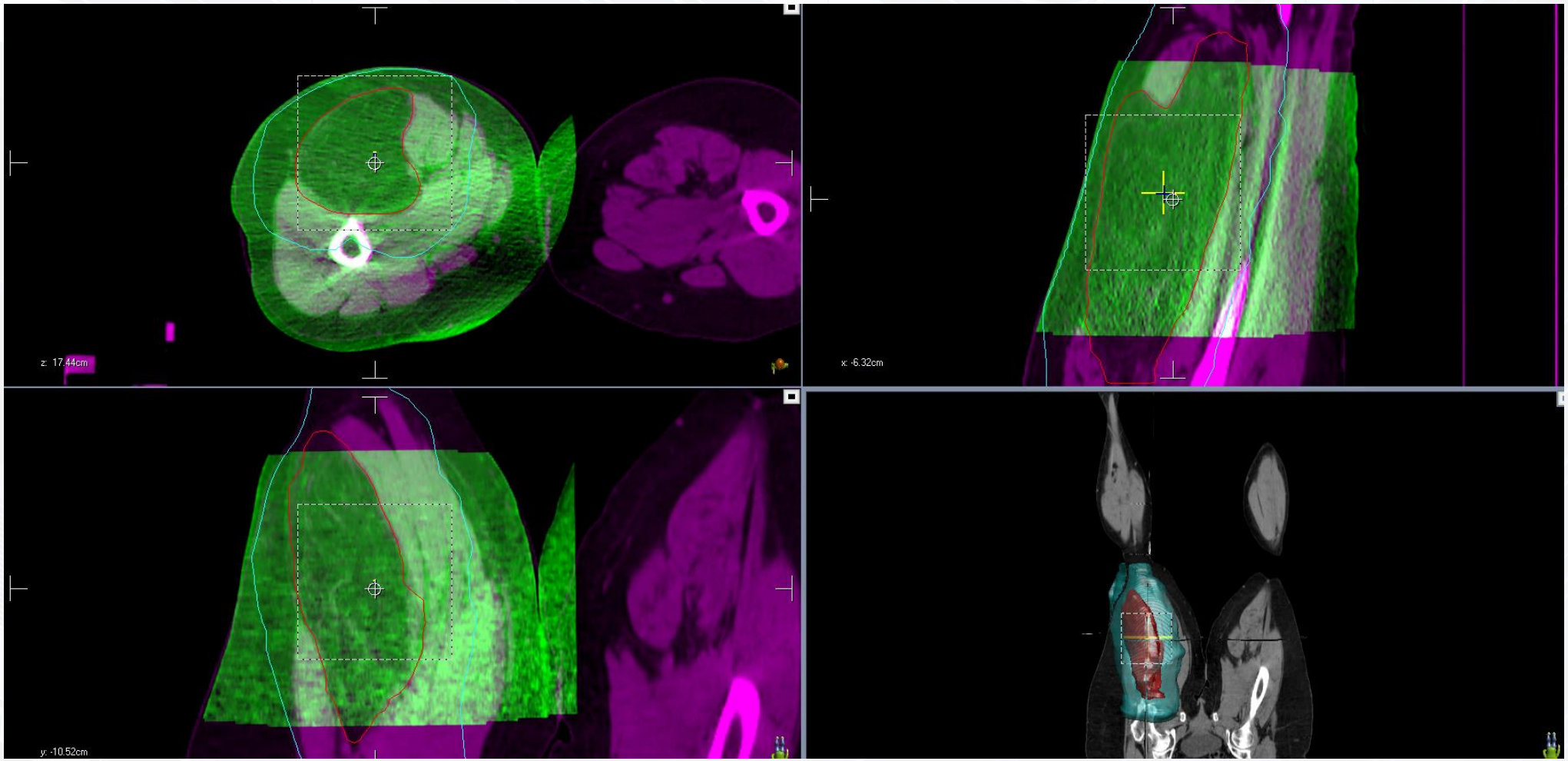
SARCOMA – POSTERIOR THIGH





Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

SARCOMA – POSTERIOR THIGH



Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

SGRT GROUP

- Cross Campus group
- Initially met every 2 weeks
- Discussed complex cases
- Supported & co-ordinated training needs
- Developed training materials for non-standard scenarios and new staff/re-orientation of staff
- A forum to raise topics for potential projects and research opportunities
- Promoted publications on SGRT

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

ADDITIONAL RESOURCES

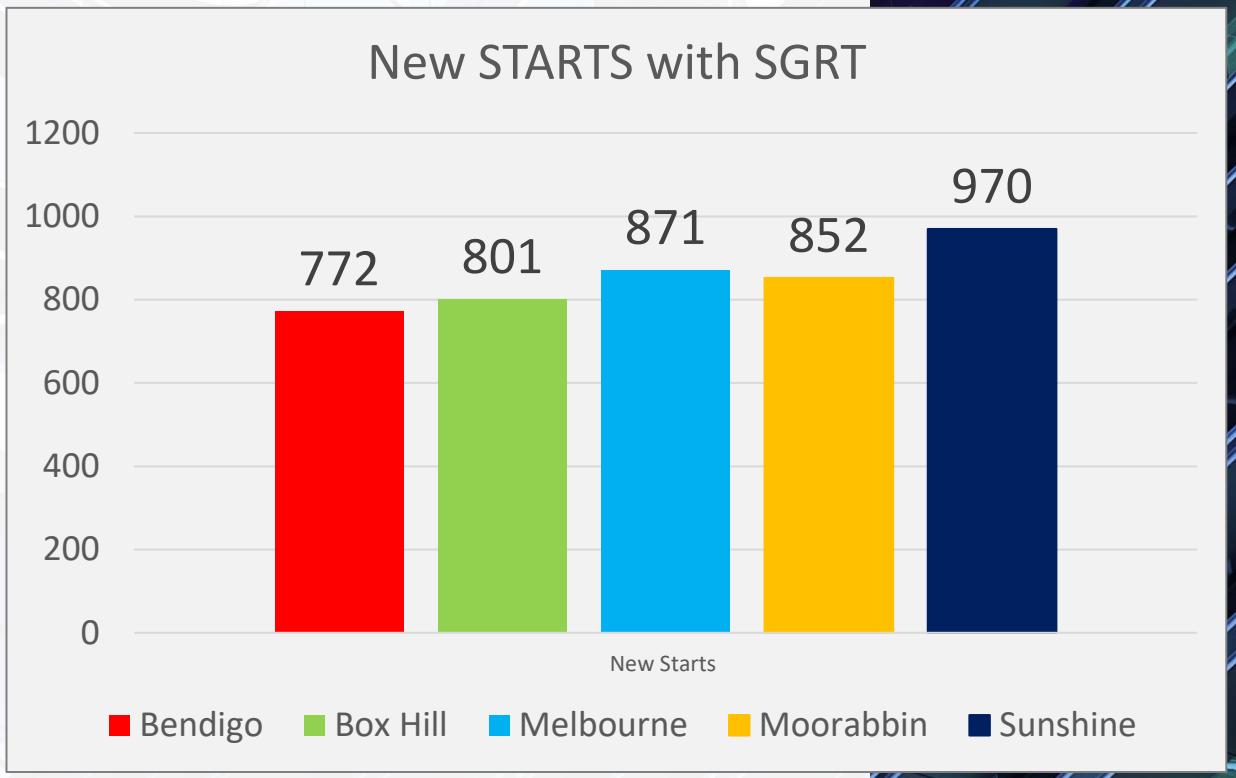
Documents > Instructional Guide Library > 3_Treatment > **AlignRT**

Name
3_Treatment_AlignRT_Cheat sheet.pdf
3_Treatment_AlignRT_CSI workflow.pptx
3_Treatment_AlignRT_DeformationCheck_MonoIsoBreast.pptx
3_Treatment_AlignRT_Extended SSD.pptx
3_Treatment_AlignRT_FOV guide.pptx
3_Treatment_AlignRT_PreTx check.pptx
3_Treatment_AlignRT_ProblemSolvingGuide.pptx
3_Treatment_Authorisation Quick Ref guide.docx
3_Treatment_Beam control & send to couch funtion for AlignRT & TB.pdf
3_Treatment_ROI Flipbook guide.pdf
3_Treatment_Software troubleshooting tips.pptx

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

SINCE IMPLEMENTATION @PMCC

- New starts – over 4000 patients
- 187 staff completed Online Learning modules and hands on training



STAFF FEEDBACK:

- Less manual handling
- Works well for extremities
- Very good for DIBH Breast treatments
- Open masks for Brian SRS better comfort for patients & no compromise to stability

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

FUTURE DIRECTIONS

- 11 th system April 2024 - only 5 linacs to go!
- End goal **EVERY** patient – tattoo free & treatment monitoring

- MapRT – June 2024

  Collision avoidance - resolve current issues

  Increase non-coplanar planning

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

OUR TEAMS

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia