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Guiding VMAT Total Body Irradiation with AlignRT

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Contents:

Source: Vision RT. AlignRT®. Retrieved Feb 27, 2026, from https://visionrt.com/our-solutions/alignrt/

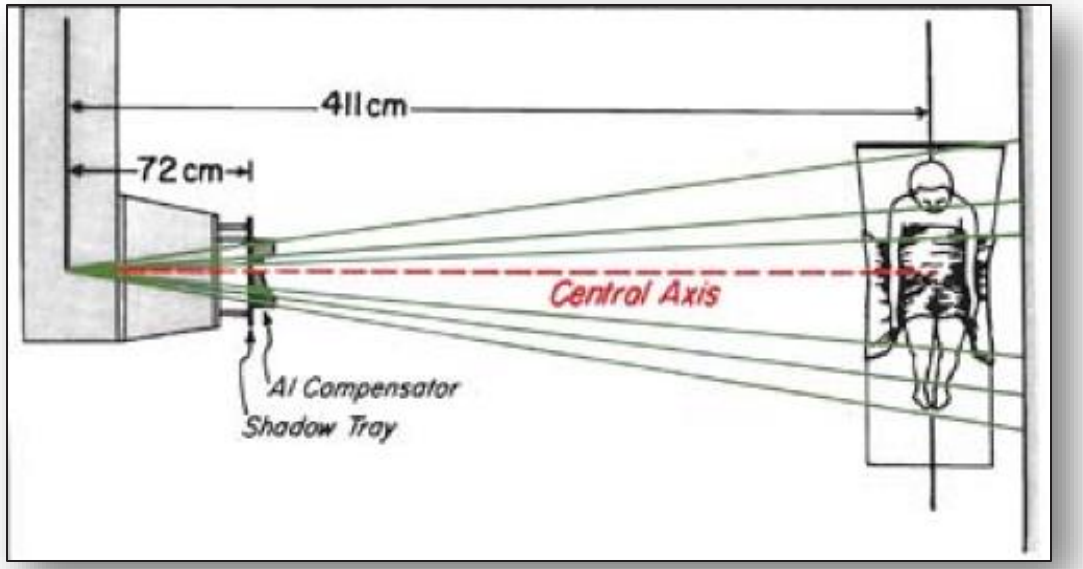
TBI Overview

Total Body Irradiation (TBI)	• To prepare for blood stem cell or bone marrow transplant (BMT)[1]
Low-dose TBI – Non-Myeloablative regimen[2]:	• 2Gy in 1# (SD) • 4Gy in 2# (BID)
High-dose TBI - Myeloablative regimen[2]:	• 12Gy in 6-8# (BID) • 13.2Gy in 11# (TID)

TBI VMAT at ONJ

TBI Clinical Implementation at ONJ:

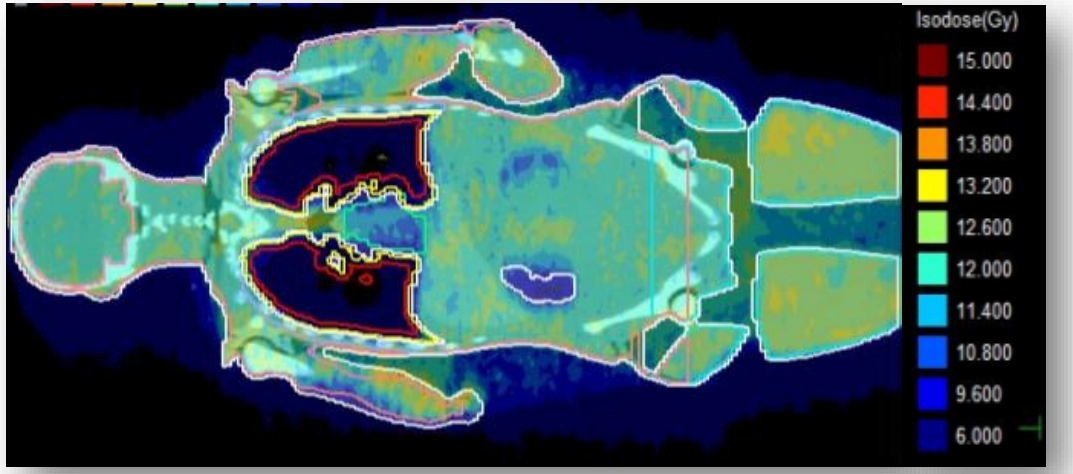
- Project started 2024, First patient mid-2025
- 8 Patients treated



Source: Khan FM, Williamson JF, Sewchand W, et al. Basic data for dosage calculation and compensation. *Int J Radiat Oncol Biol Phys.* 1980;6:745-751

VMAT Vs Traditional Bilateral Fields:

- ONJ Bunkers too small
- CSI VMAT Experience
- Improved dose homogeneity & OAR sparing[3,4,5]
- Patient comfort enhanced[4,5]



Benefits of SGRT for TBI VMAT

Tattoo-Free **Workflow**[6]

Enhanced **Verification**[6,7]

Improved Setup Accuracy and **Speed**[6,8]

Continuous Intra-fraction **Monitoring**[6,7]

CT Simulation

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CT Simulation

Setup and Equipment:

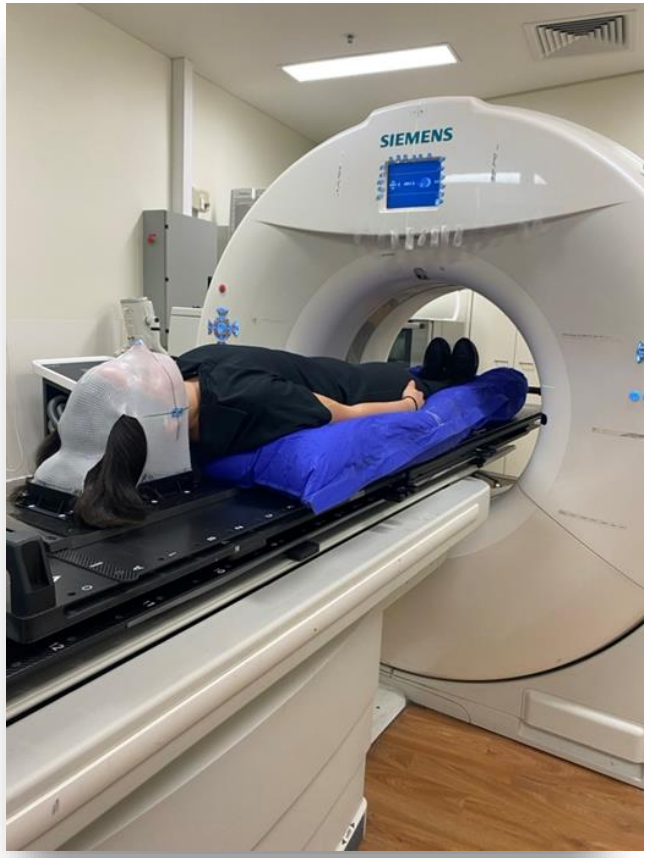
- **TBI STEP**
- Supine, arms by side, legs flat
- Full Length BodyFIX
- Thermoplastic 3-point mask
- No clothes, excl. underwear

Workflow:

- Approx. Isocenter
- Immobilisation
- Landmark and record
- Perform a HFS scan, Rotate, then FFS scan

CT Scan:

- 5mm slice thickness
- Extended FOV



Planning

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pper PlanCT/Lower PlanCT Fusion (no Rotation)
T/CT Fusion #1
yioto 2
0231023TBITK
40124TBICUpper
024-01-24 17:00:53
40124TBICLower
024-01-24 17:05:58
270.25 mm
CT (P): 117
CT (S): 233
WW 1440 HU
WL 394 HU
CT (S): -1024 HU
A
S
-297.33 mm
R
OARs
Mandatory
Lung_L/R
Lung_Bilat
Lung_Bilat-10mm
Lung_Bilat-3mm
Kidney_L/R
Kidney_Bilat
Lens_L/R
Reporting
Brain
Thyroid
Heart
Thecal sac
Testes
OralCavity

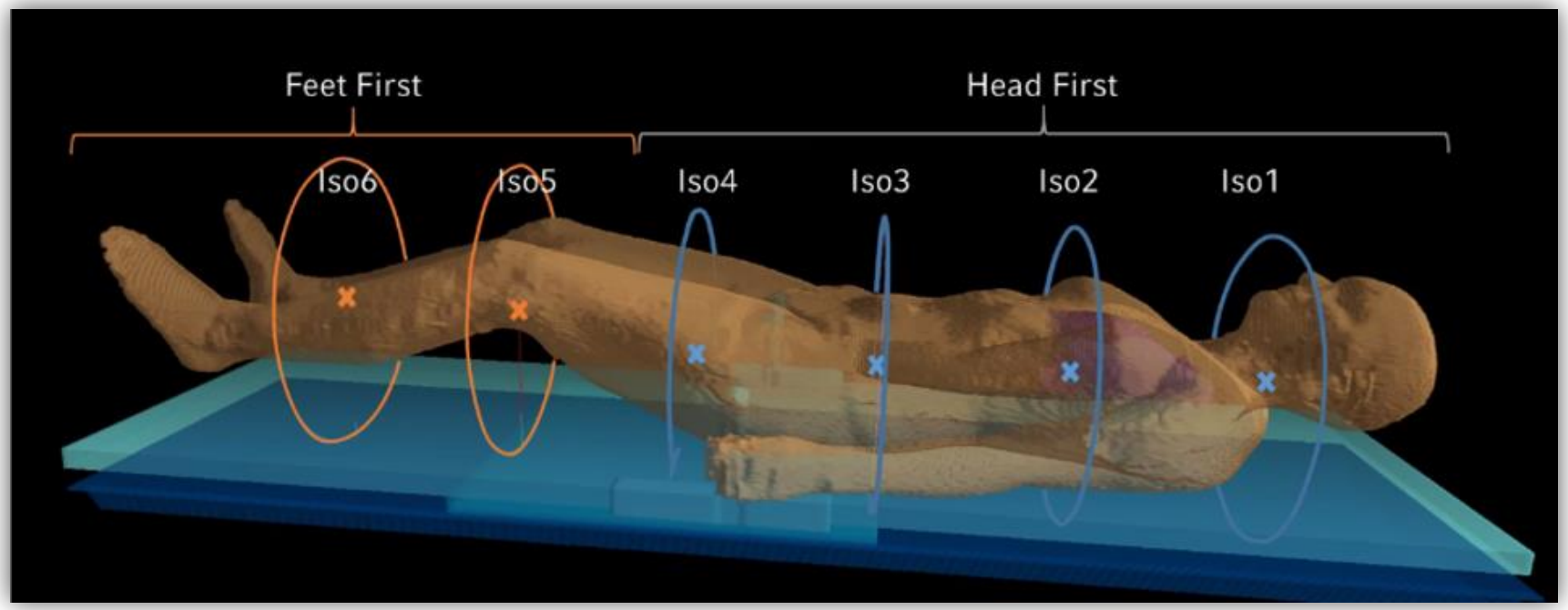
Monaco Plan Preparation

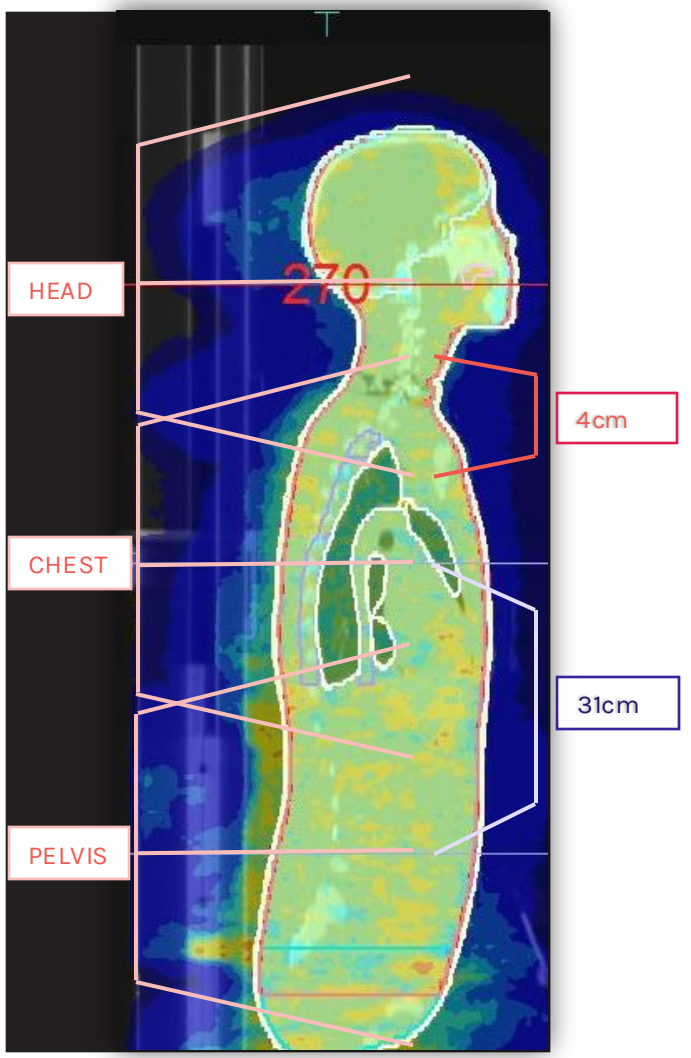
Isocentres:

- 5-8 total overlapping 360’ arcs

Plan Objectives:

- Minimise dose to Kidneys and Lungs

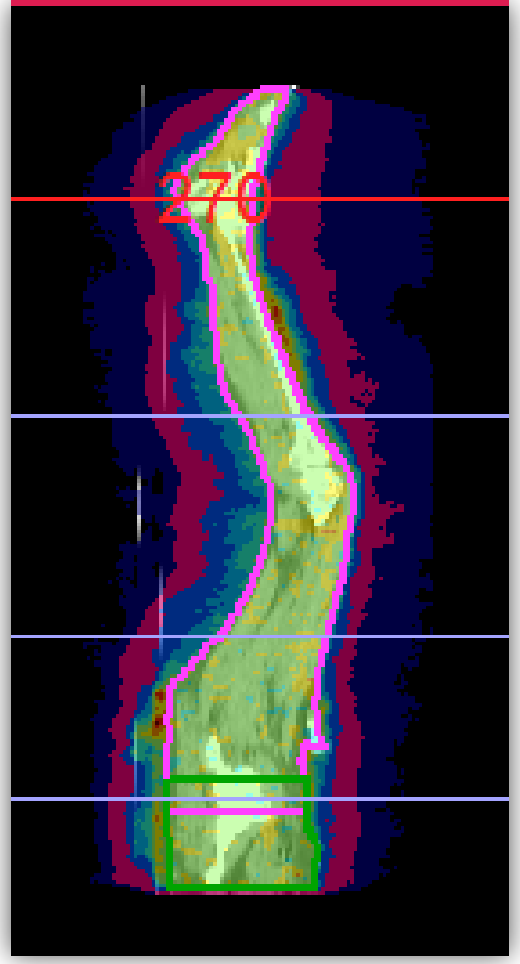




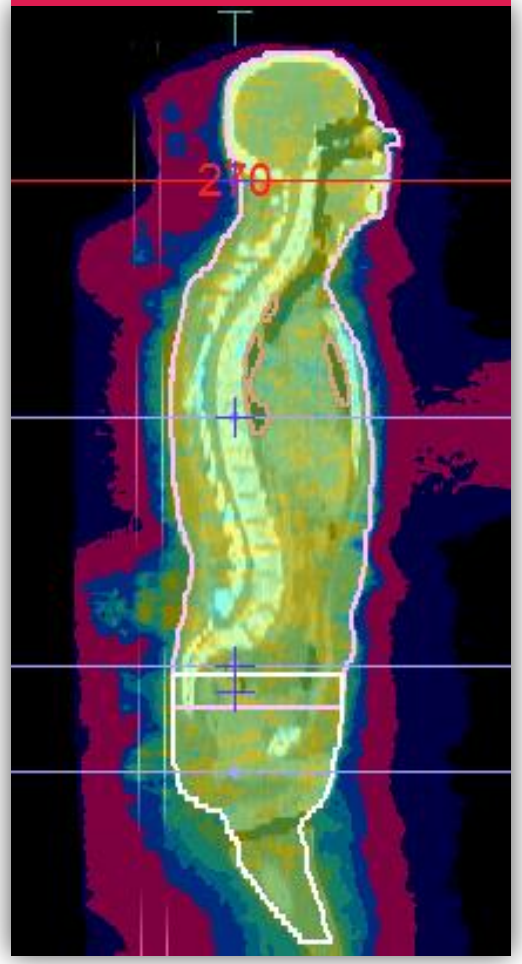
Source: Losert, C., Shpani, R., Kießling, R. *et al.* Novel rotatable tabletop for total-body irradiation using a linac-based VMAT technique. *Radiat Oncol* **14**, 244 (2019). https://doi.org/10.1186/s13014-019-1445-3

Planning workflow

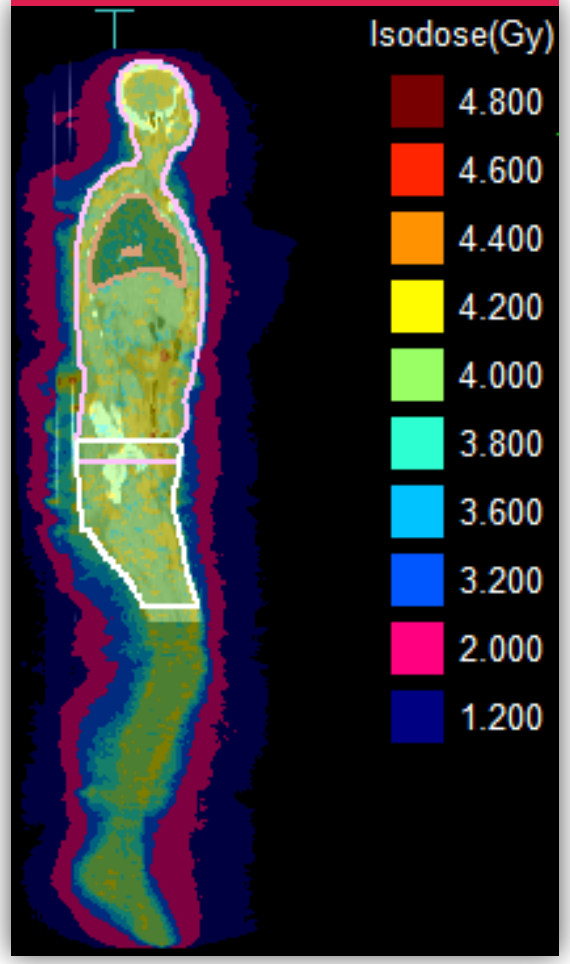
1 FFS plan



2 FFS base plan + HFS plan



3 Total (sum) plan



AlignRT

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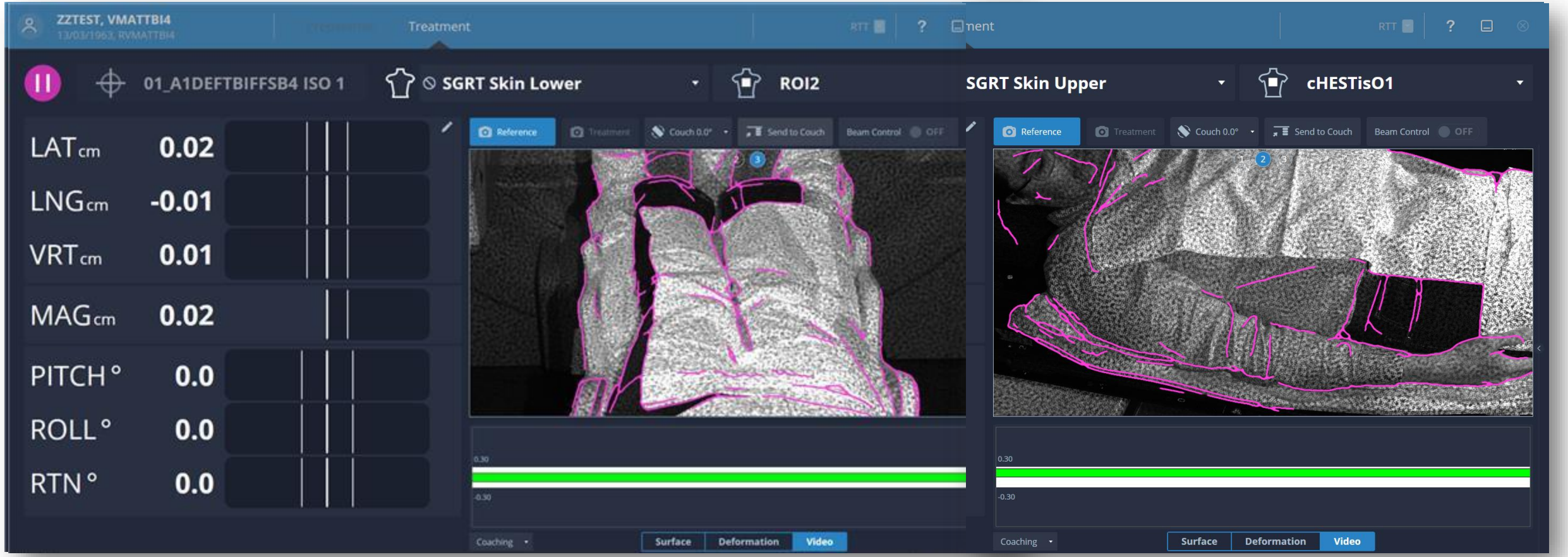
TBI SGRT Setup Testing



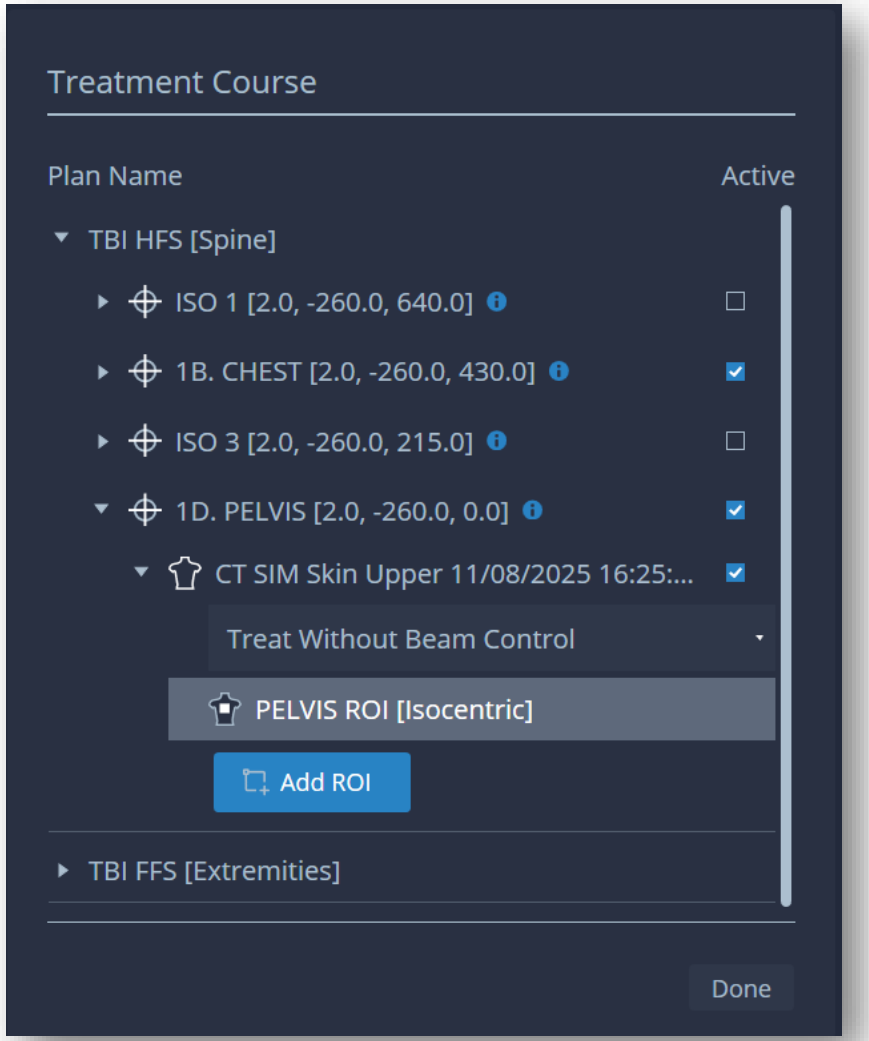
AlignRT: Preparation

HFS:

- **Skin structure:** Head-> Mid-thigh
  - 2x ISOs: Chest and Pelvis
    - ROIs: Chest and Pelvis

FFS:

- **Skin structure:** Abdo-> Toes
  - 2x ISOs: Mid-thigh and Knee
    - ROIs: Pelvis, Lt leg & Rt Leg



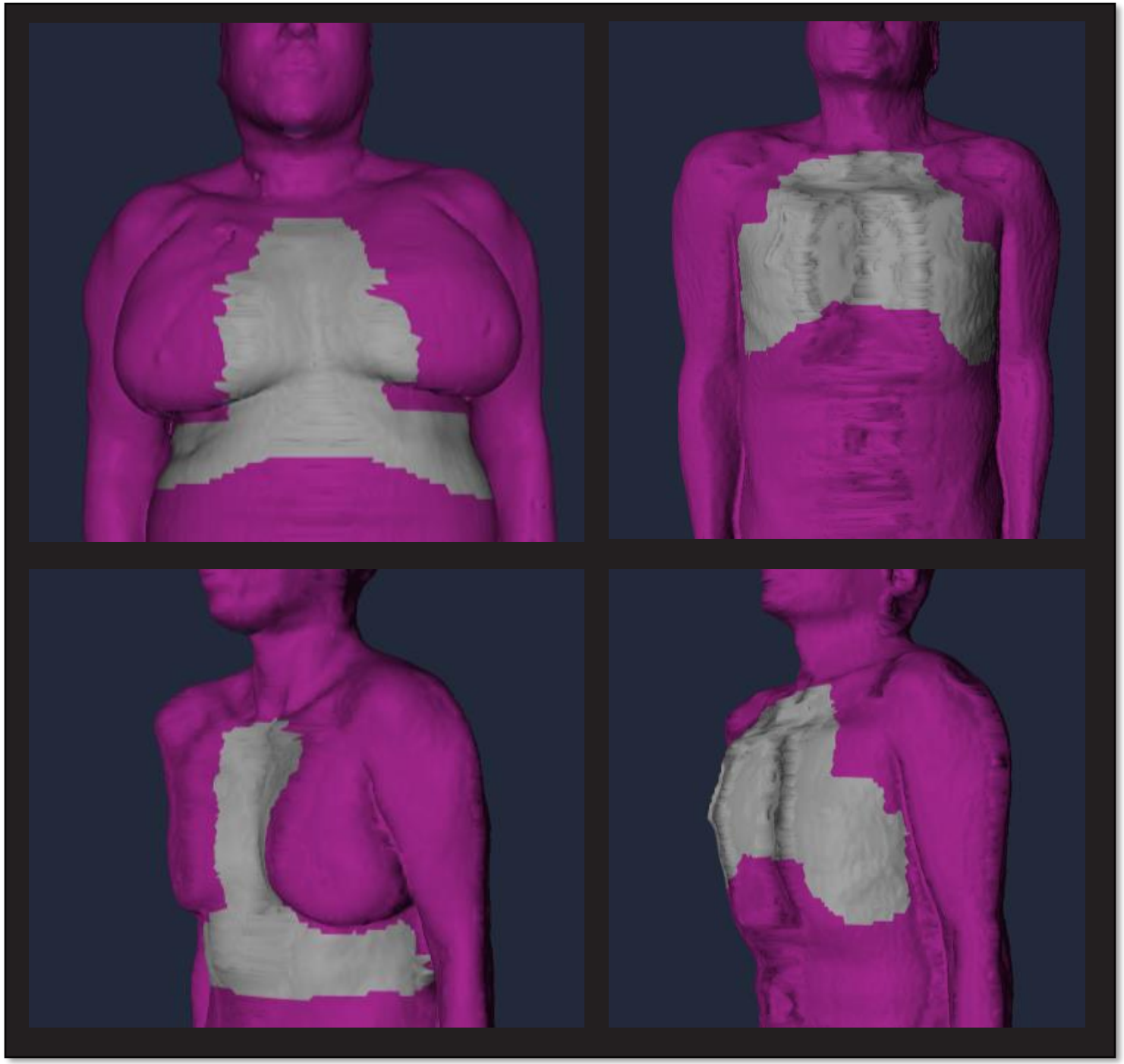
Chest ISO & ROI

Include:

- Sternum
- Edge of ribs
- Lateral

Do not include:

- Unstable areas
- Breathing motion
- Immobilisation



Pelvis ISO & ROI

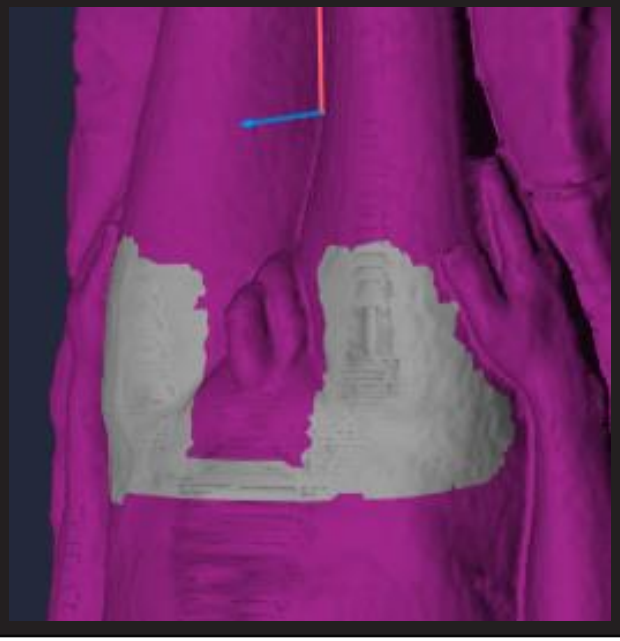
Include:

- Anterior hips
- Lateral hips

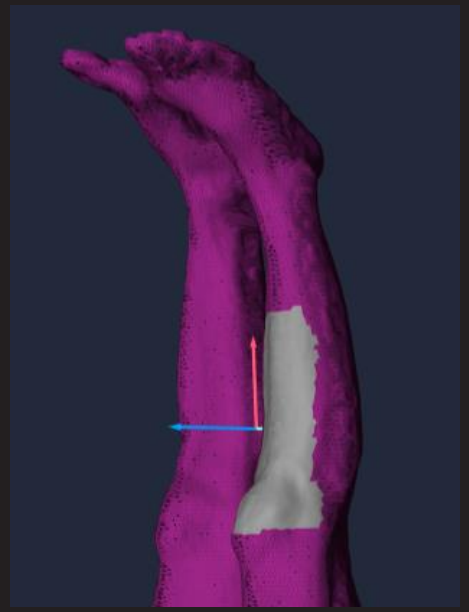
Do not include:

- Modesty area
- Hands on side
- Areas of motion

Mid Thigh ISO & ROI



Knee ISO & Rt Knee ROI



Knee ISO & Lt Knee ROI

Treatment

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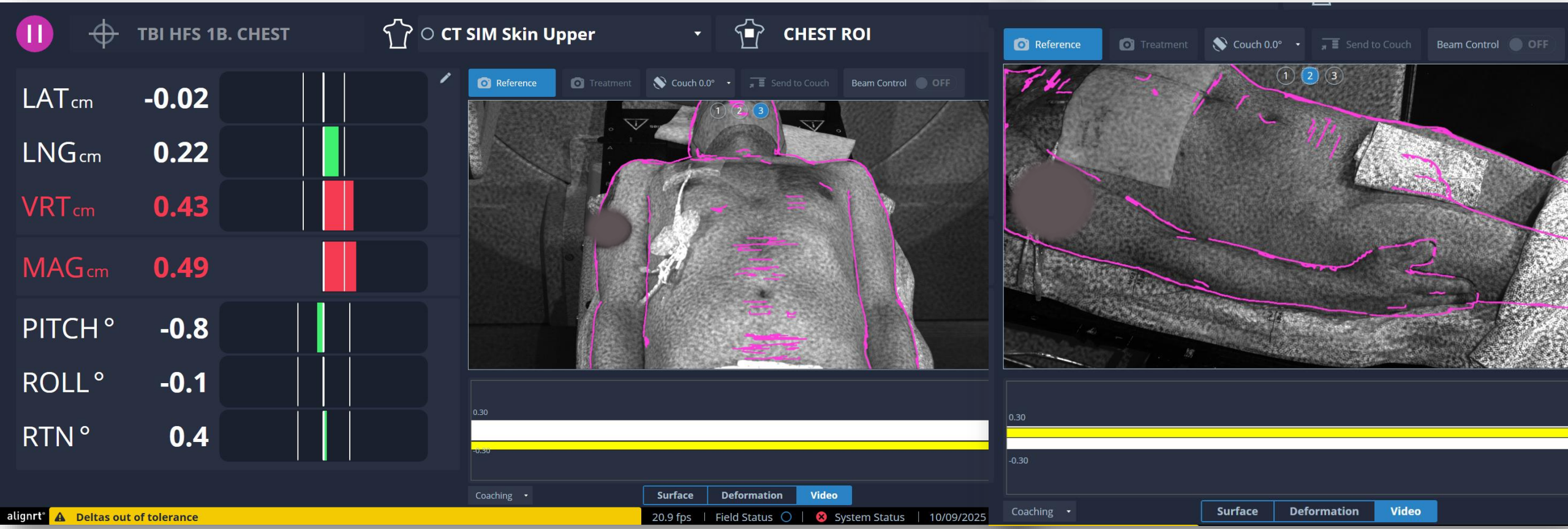
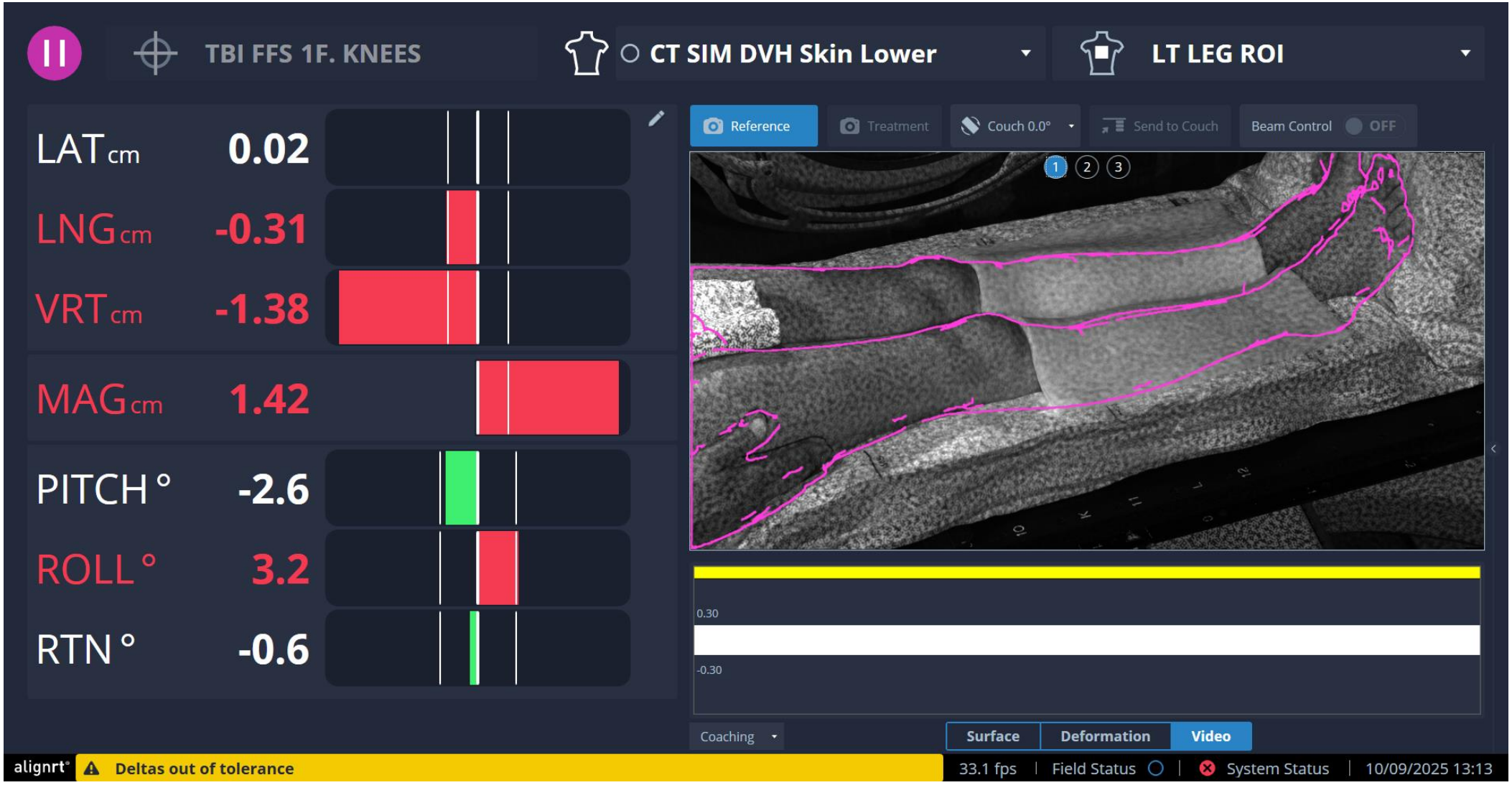
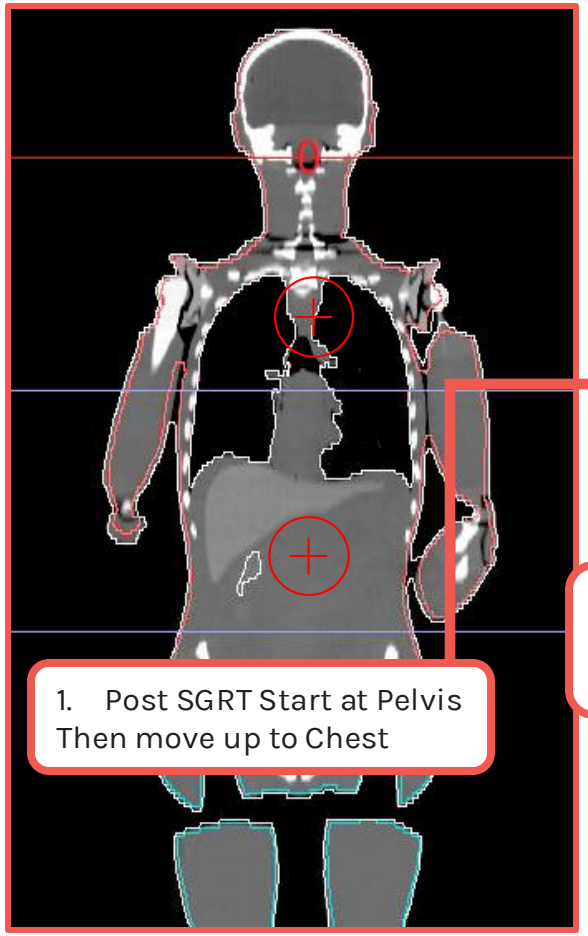
Treatment Workflow: HFS



Treatment Workflow: FFS



Treatment Workflow post SGRT



1. Post SGRT Start at Pelvis
Then move up to Chest

2. CBCT, Apply shifts. Treat

3. Shift to Head Iso
Orthogonal 2DkV image,
Apply Lat + Vert shifts only.
Treat

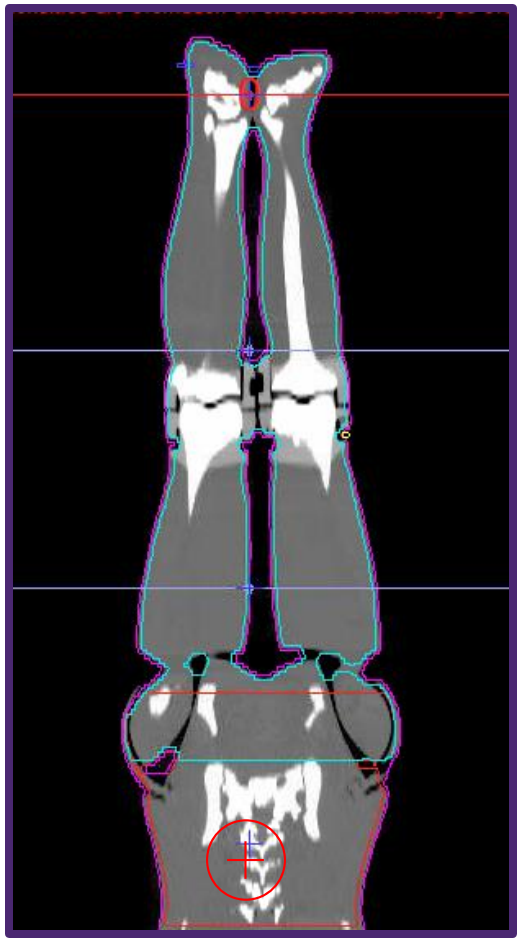
4. Shift to Pelvis Iso,
Orthogonal image, Apply
Lat + Vert shifts only. Treat

5. Rotate TBI STEP
to FFS

6. Set to Thigh Iso using couch
long value. CBCT.
Apply Lat + Vert Shifts only.
Treat

7. Long shift to Knee
iso, AP 2DkV, shift Lat.
Treat

8. Long shift to Feet
Iso, AP 2DkV, shift Lat.
Treat



EXPERIENCE

- Patient Experience
- Contour changes
- Reduced imaging

FUTURE

- Beam hold
- Faceless Masks
- Further reduce imaging

Acknowledgments:

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All patient images shown in this presentation have been included with documented informed consent

Thank you
Any Questions?

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