Lymphoma treatment using surface-guided radiation therapy and a faceless cast – a case study

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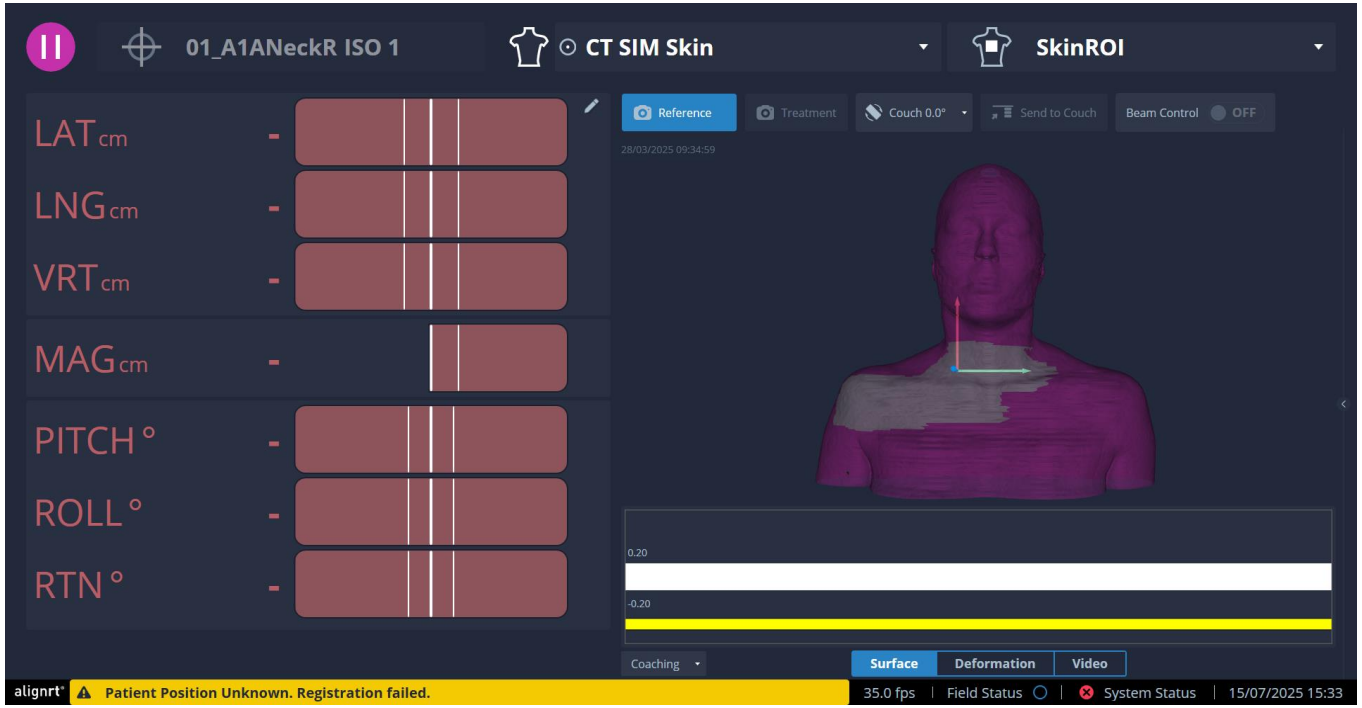
Austin Health

AlignRT® at ONJ

Commissioned for:

- Breast (free-breathing and DIBH)
- Extremities
- Total Body Irradiation (TBI)



Case Study

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Patient History

32-year-old Female

Presenting Symptoms: Dysphagia

Medical History: Grave's disease & Claustrophobia

Social History: Non-smoker, regular exercise

Diagnosis:

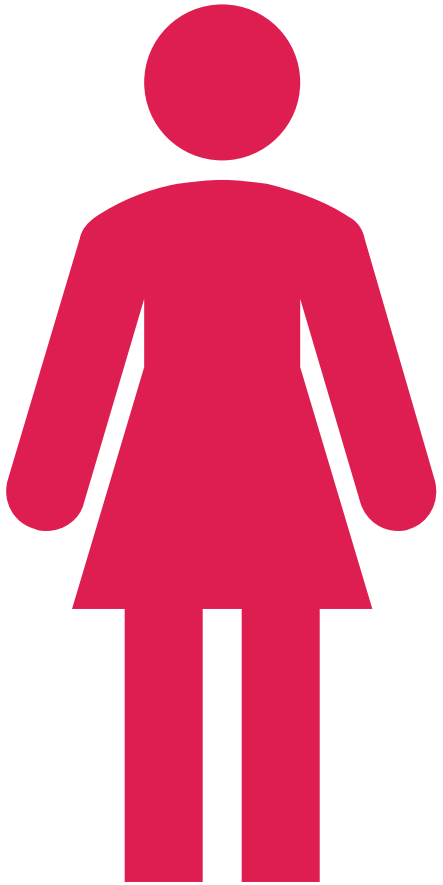
Classical Hodgkin Lymphoma

Stage IA - *One node or a group of adjacent nodes*

Ann Arbor/Lugano classification[3]

Imaging and diagnostic procedures:

PET CT: 'SCF nodes + possible upper mediastinal/paratracheal and level VI'



Treatment Regimen

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Treatment Regimen

1. Chemotherapy

- 2 cycles of 'ABVD' protocol[4]

2. Radiation Therapy

- 20Gy in 10 fractions, 5 fractions per week to the right neck nodes[5]

Considerations:

Patient's age: Fertility preservation & possible late effects

Highly Claustrophobic: Head and Neck sites treated with full mask

Simulation Procedures

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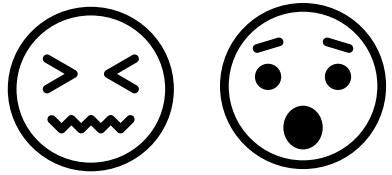
Simulation Considerations

Patient highly claustrophobic

- Cast creation
- CT scanner bore



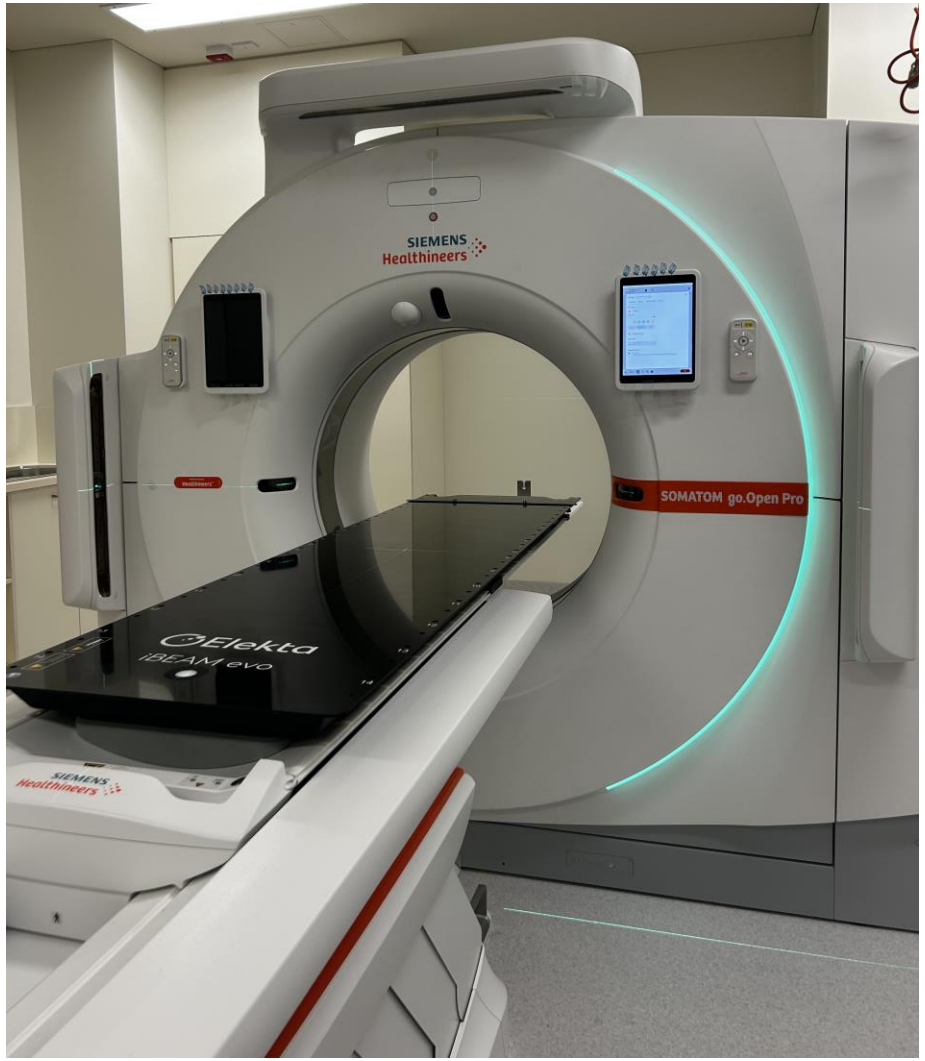
How will she tolerate treatment each day?

Simulation

Image ref: https://www.canberratimes.com.au/story/7917988/why-this-mask-will-always-win-halloween/

Image ref: https://www.orfit.com/radiation-oncology/blog/an-analysis-of-patient-comfort-during-head-and-neck-radiotherapy

Procedure



2 simulation sessions

1. Creation of mask and vac-bag
2. Scan taken

Lorazepam administered

- Required for treatment?
- Transport considerations

Treatment Planning

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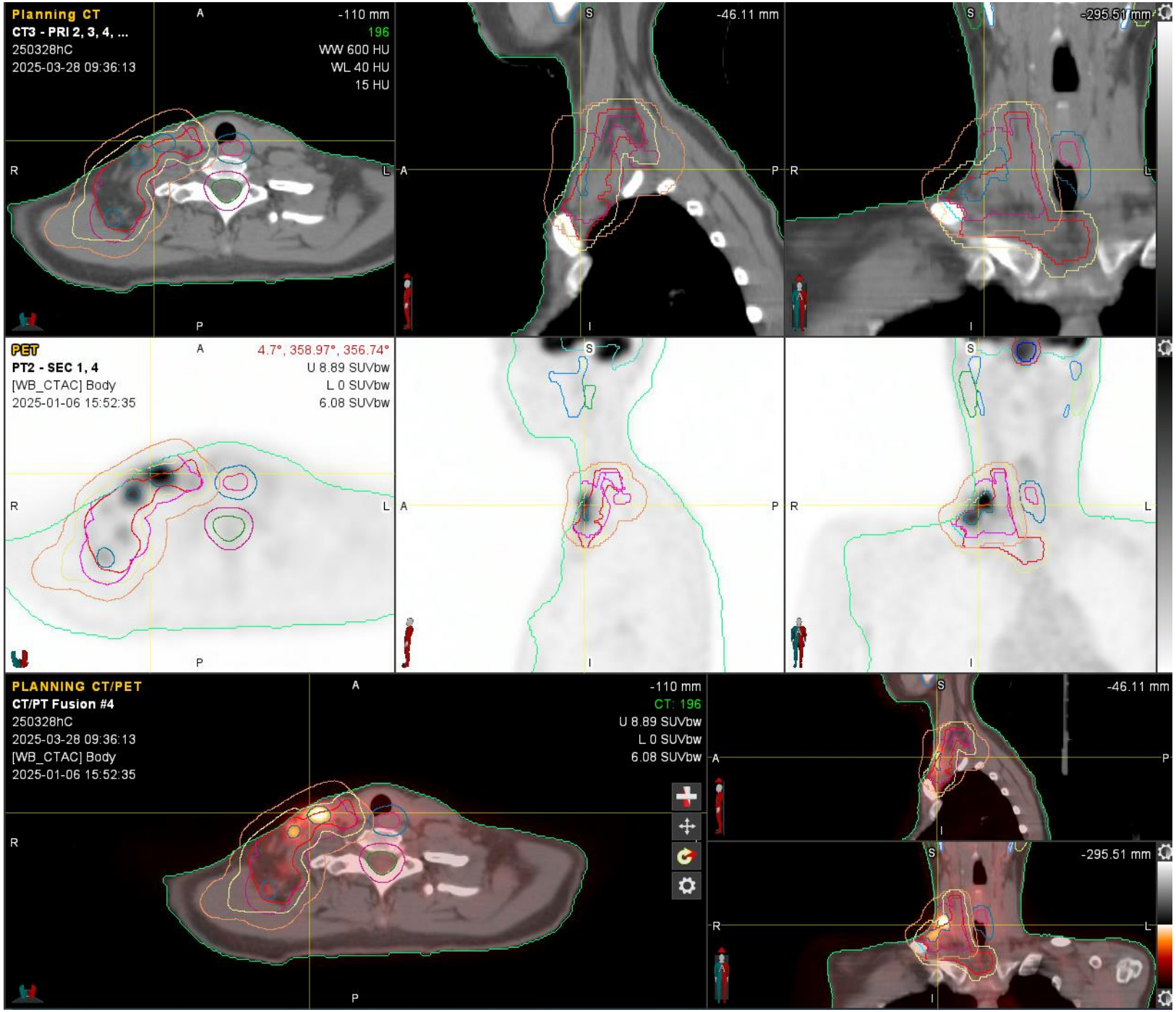
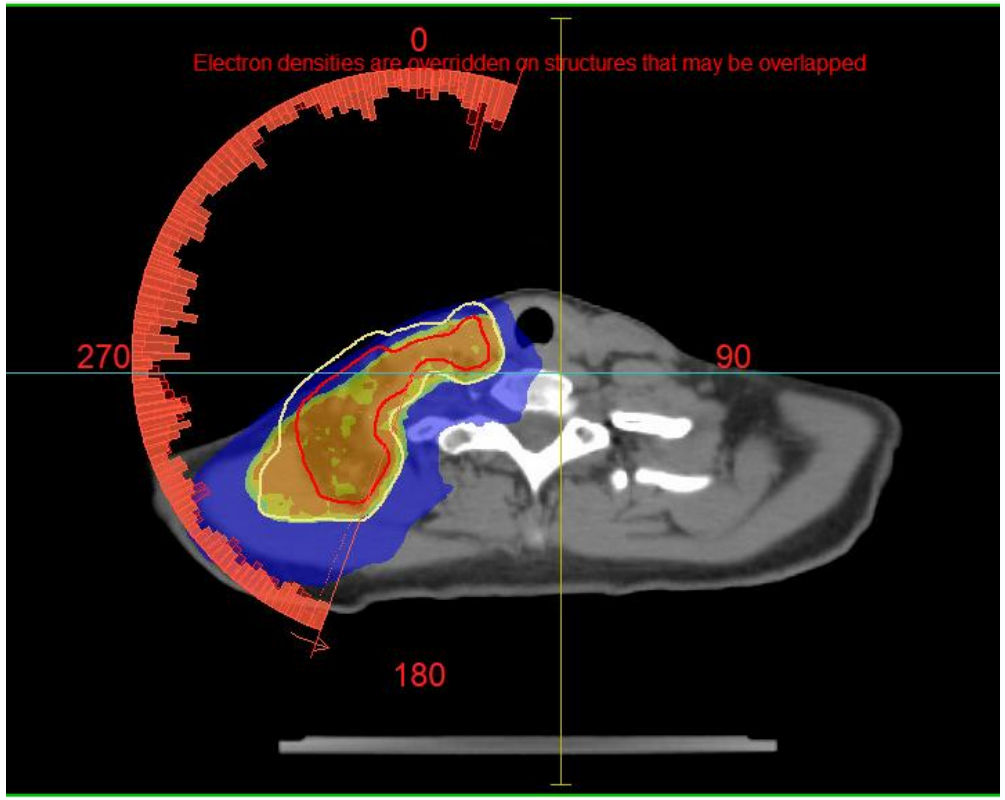
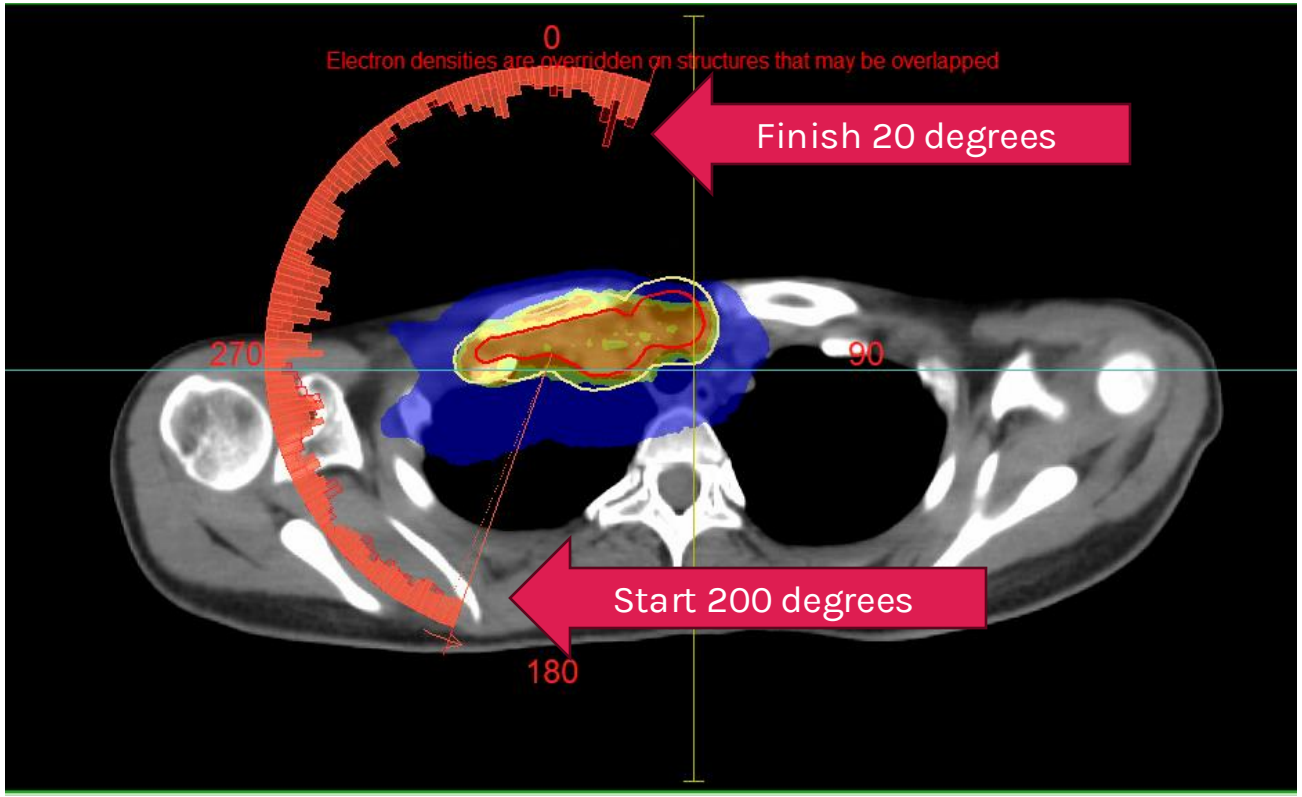
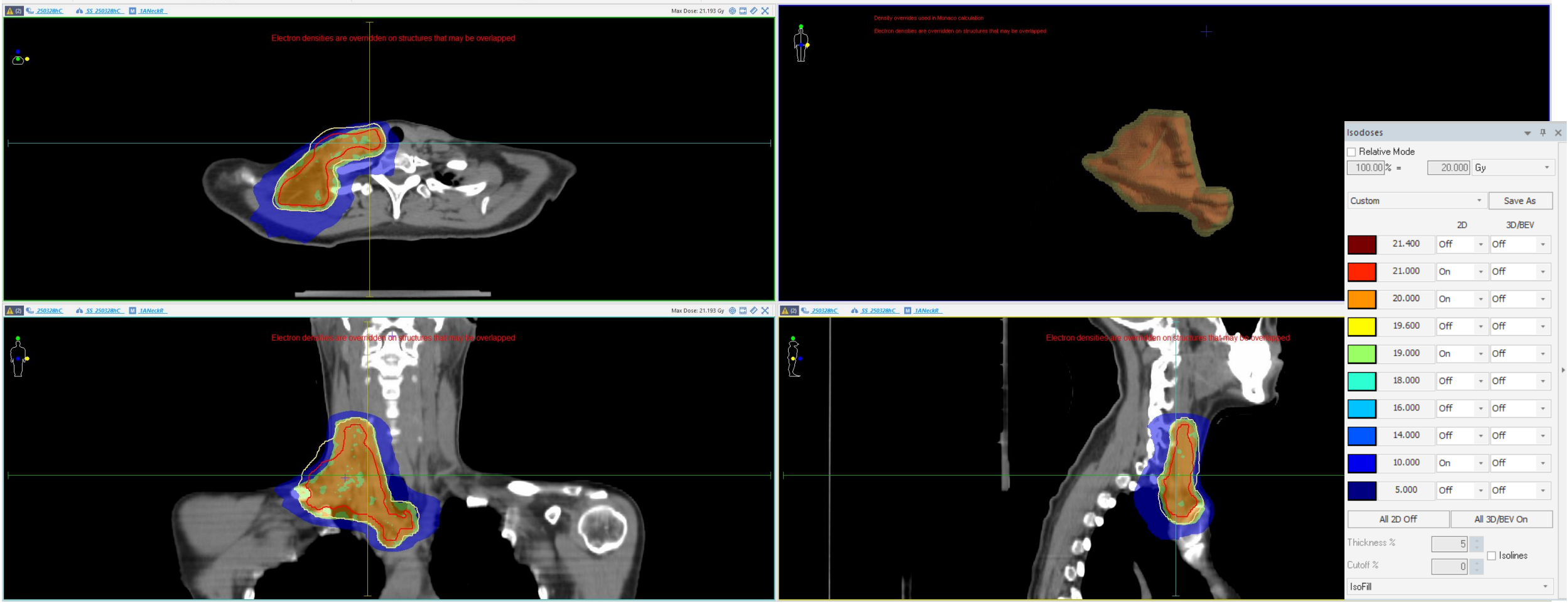

Planning CT
CT3 - PRI 2, 3, 4, ...
250328hC
2025-03-28 09:36:13
-110 mm
196
WW 600 HU
WL 40 HU
15 HU
-46.11 mm
-295.51 mm
PET
PT2 - SEC 1, 4
[WB_CTAC] Body
2025-01-06 15:52:35
4.7°, 358.97°, 356.74°
U 8.89 SUVbw
L 0 SUVbw
6.08 SUVbw
PLANNING CT/PET
CT/PT Fusion #4
250328hC
2025-03-28 09:36:13
[WB_CTAC] Body
2025-01-06 15:52:35
-110 mm
CT: 196
U 8.89 SUVbw
L 0 SUVbw
6.08 SUVbw
-46.11 mm
-295.51 mm

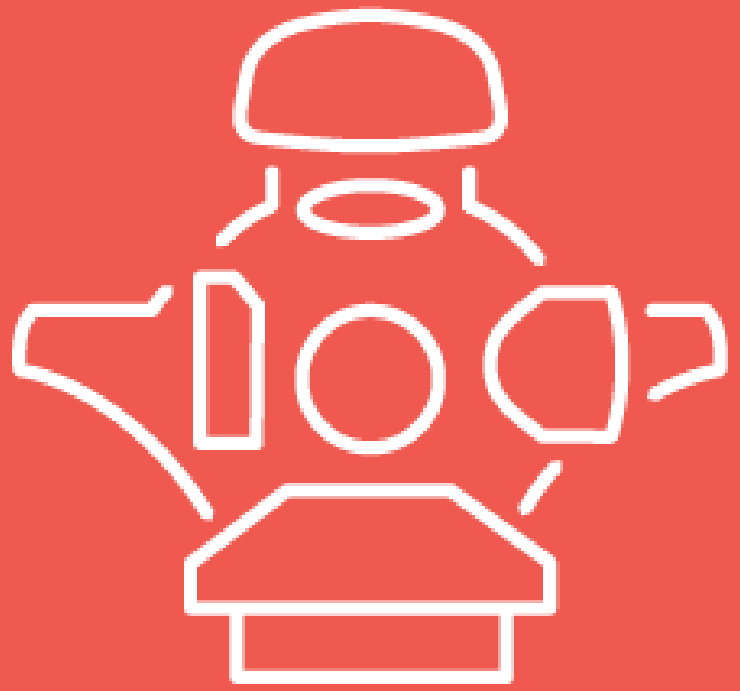


Superiorly on the volume



Inferiorly on the volume


Max Dose: 21.193 Gy
Electron densities are overridden on structures that may be overlapped
Density overrides used in Monaco calculation
Electron densities are overridden on structures that may be overlapped
Isodoses
Relative Mode
100.00 % = 20.000 Gy
Custom
Save As
2D
3D/BEV
21.400 Off Off
21.000 On Off
20.000 On Off
19.600 Off Off
19.000 On Off
18.000 Off Off
16.000 Off Off
14.000 Off Off
10.000 On Off
5.000 Off Off
All 2D Off
All 3D/BEV On
Thickness % 5
Isolines
Cutoff % 0
IsoFill



Treatment

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1. Setup with SGRT

- Set shoulder position
- No mask

2. Place on mask

- Minimises time in mask

3. IGRT process

- Daily CBCT
- Soft tissue match

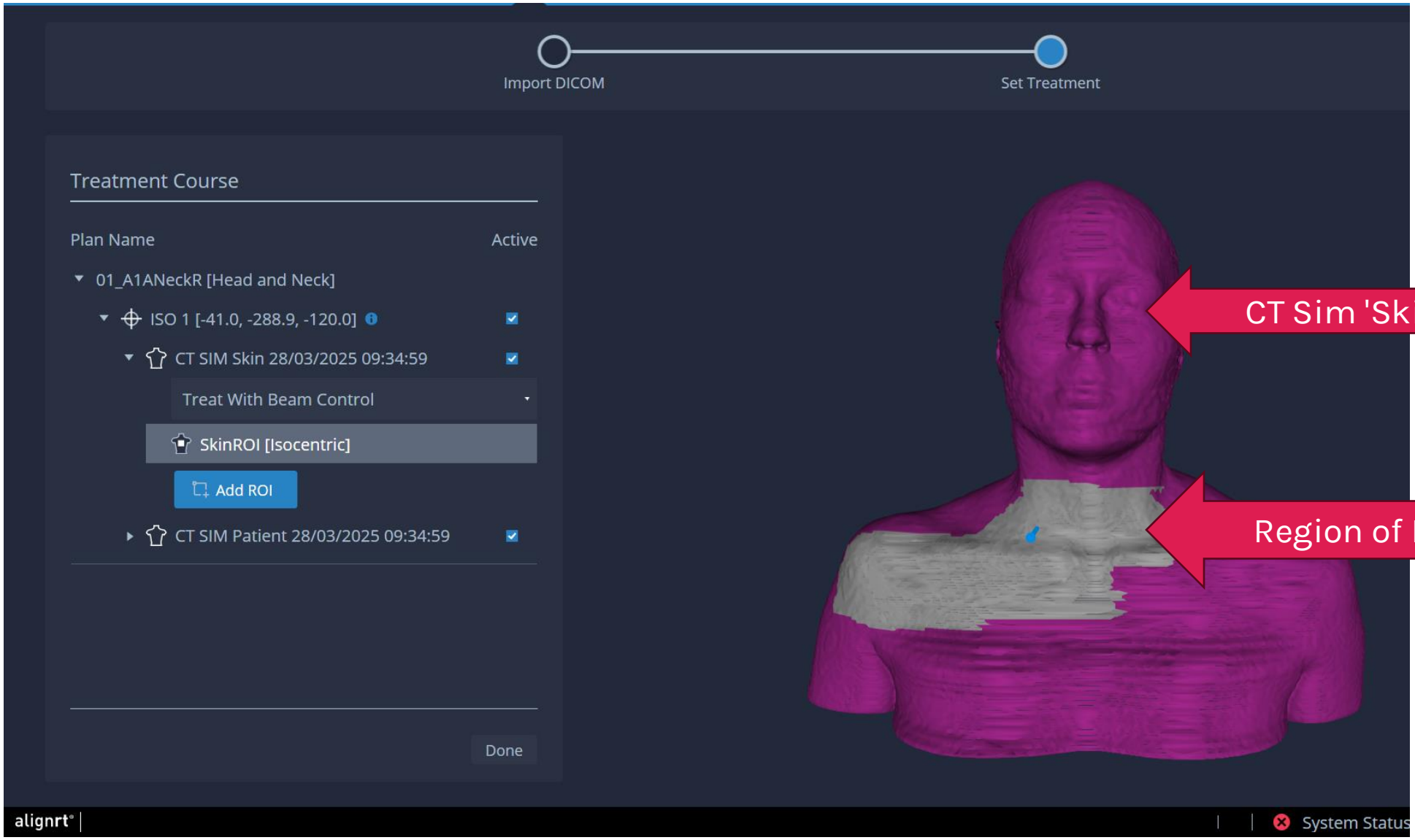
4. SGRT reference capture

- Daily to ensure patient position

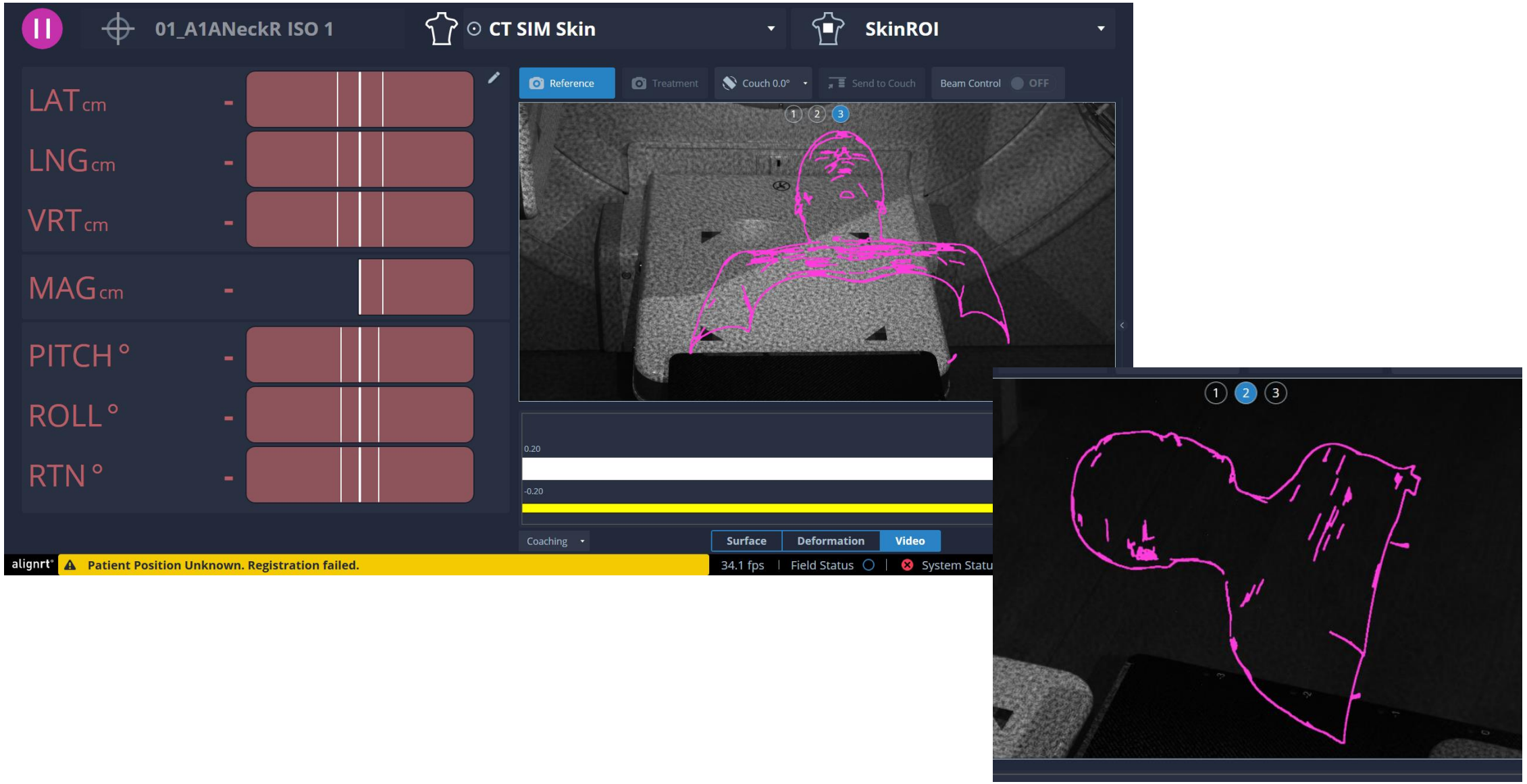
5. Treatment delivery

- Monitoring with beam control

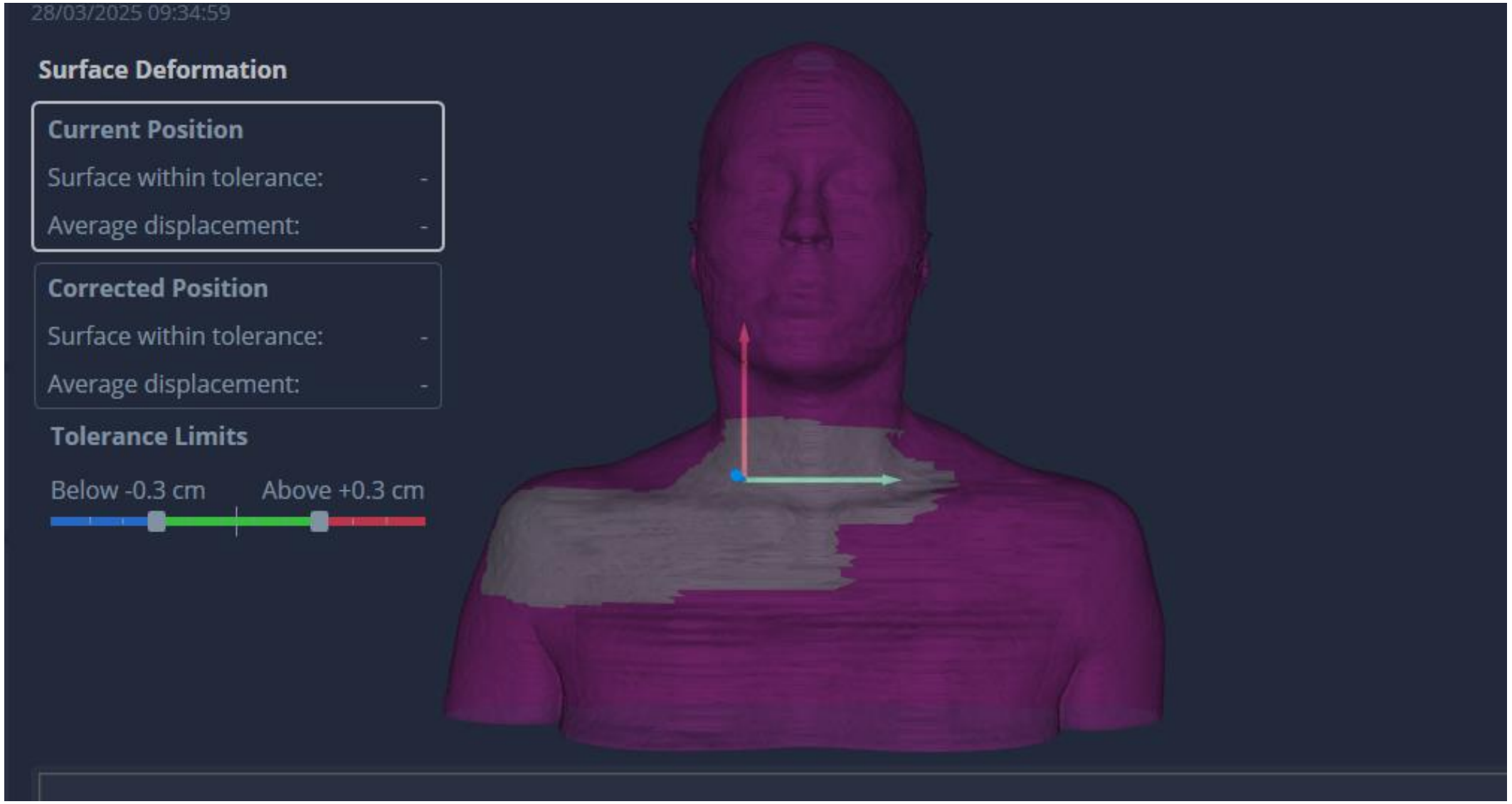
SGRT process



Set-up views: postural video



Set-up views: deformation tool



Treatment challenges

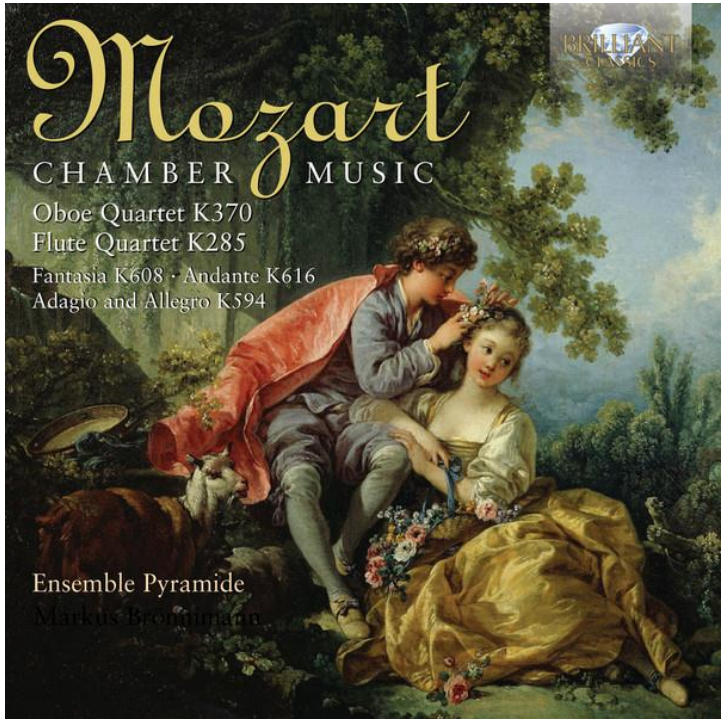
- Set-up accuracy: shoulder and clavicle positioning
  - SGRT increased accuracy overall

- Patient nerves = more intense breathing
  - Beam control used for treatment accuracy
  - Tolerance: 0.2cm (-/+)

Patient comfort

How were we able to support the patient's comfort?

1. Music
2. Lorazepam - given each treatment
3. Reassurance and support
4. Using SGRT and beam monitoring



Patient Care

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Patient Feedback

- Would not have had treatment without the faceless mask
- Grateful that these adjustments were able to be made
- Wants this to be available to other patients so they can be more comfortable
- Made treatment bearable but not comfortable

Reflections

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Reflections

- **SGRT + Faceless mask = Success!**
- Wider implementation of faceless mask/SGRT protocols for head and neck sites
- Setup issues: What can we improve?
- Patient feedback

Acknowledgements

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SGRT Implementation Team

Associate Professor Richard Khor – Radiation Oncologist

References

1. Vision RT Ltd (2025) *AlignRT*, *Vision RT*. Available at: https://visionrt.com/our-solutions/alignrt/#:~:text=It's%20a%20system%20that%20tracks,average%20of%2022%25%20per%20fraction. (Accessed: 22 July 2025).

2. Vision RT Ltd (2025) *An overview of the key principles of the underlying technologies used by SIMRT, MapRT, alignrt and Dosert.*., *Vision RT*. Available at: https://visionrt.com/our-technology/ (Accessed: 22 July 2025).

3. Yoo, K.H. (2022) 'Staging and response assessment of lymphoma: A brief review of the Lugano classification and the role of FDG-PET/CT', *Blood Research*, 57(S1). doi:10.5045/br.2022.2022055.

4. Cancer Institute NSW. *Hodgkin lymphoma ABVD (doxorubicin bleomycin vinblastine dacarbazine) early stage*, *eviQ*. Available at: https://www.eviq.org.au/haematology-and-bmt/lymphoma/hodgkin-lymphoma/57-early-stage-abvd-doxorubicin-bleomycin-vinblas (Accessed: 22 July 2025).

5. Cancer Institute NSW. *Hodgkin lymphoma early-stage EBRT to involved sites*, *eviQ*. Available at: https://www.eviq.org.au/radiation-oncology/haematology/3619-hodgkin-lymphoma-early-stage-ebrt-to-involved#dose-prescription (Accessed: 22 July 2025).