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First Experiences with Abdominal DIBH on Halcyon

SGRT Nordics 17.04.26

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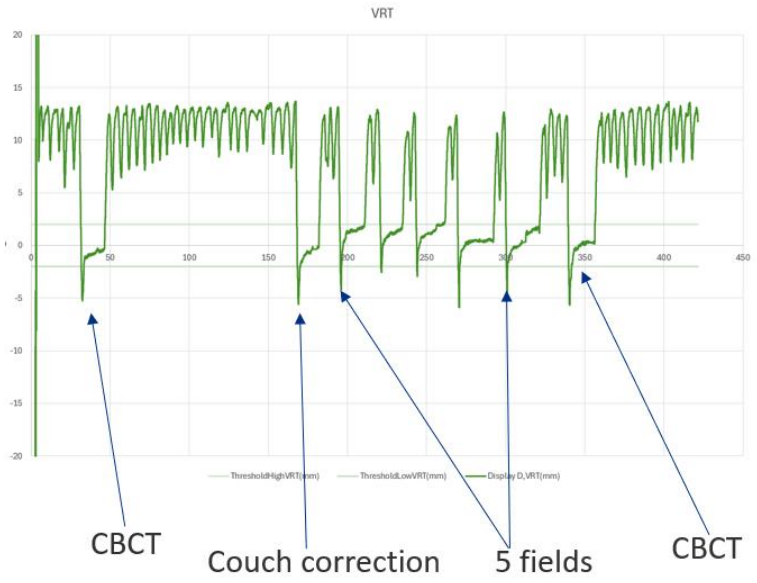
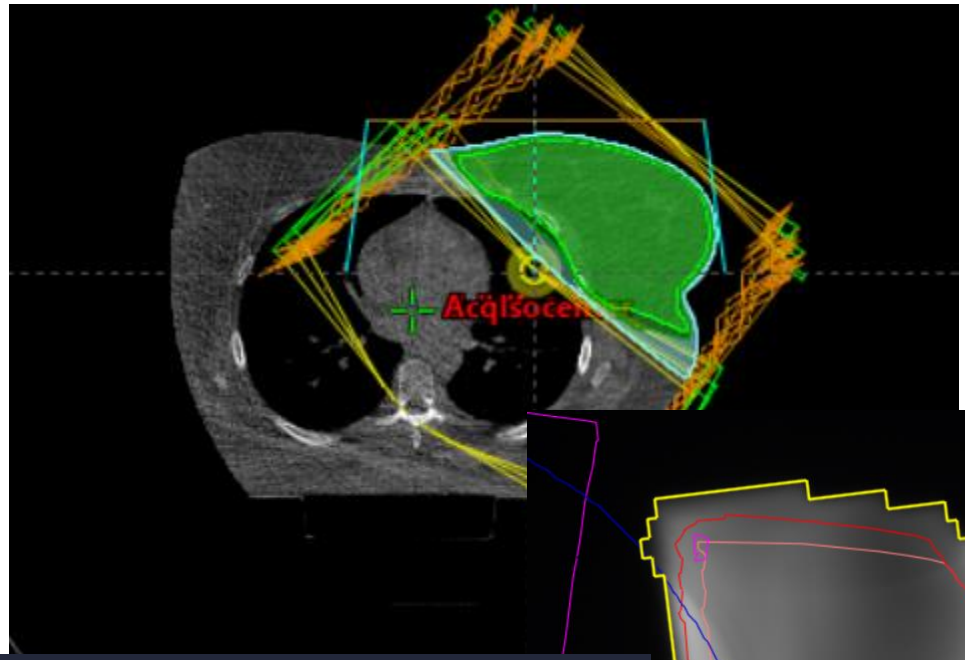
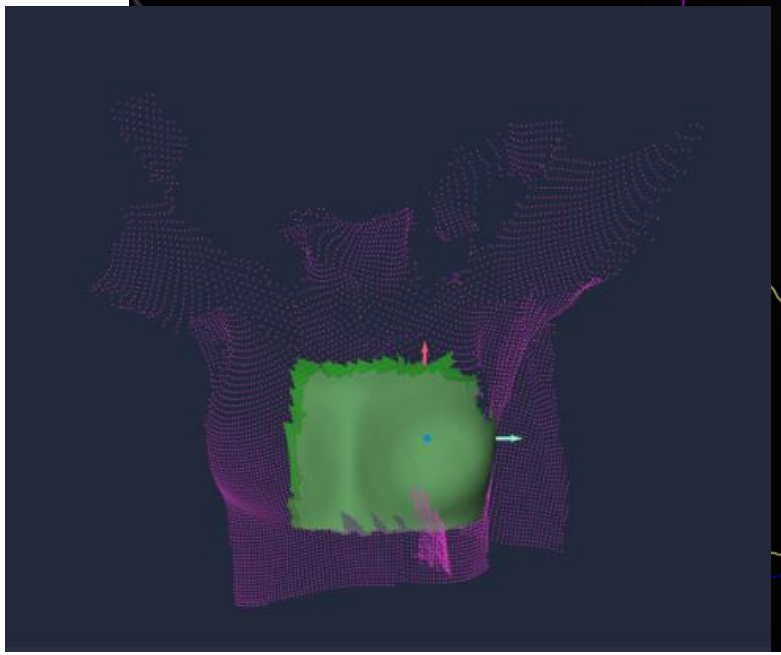
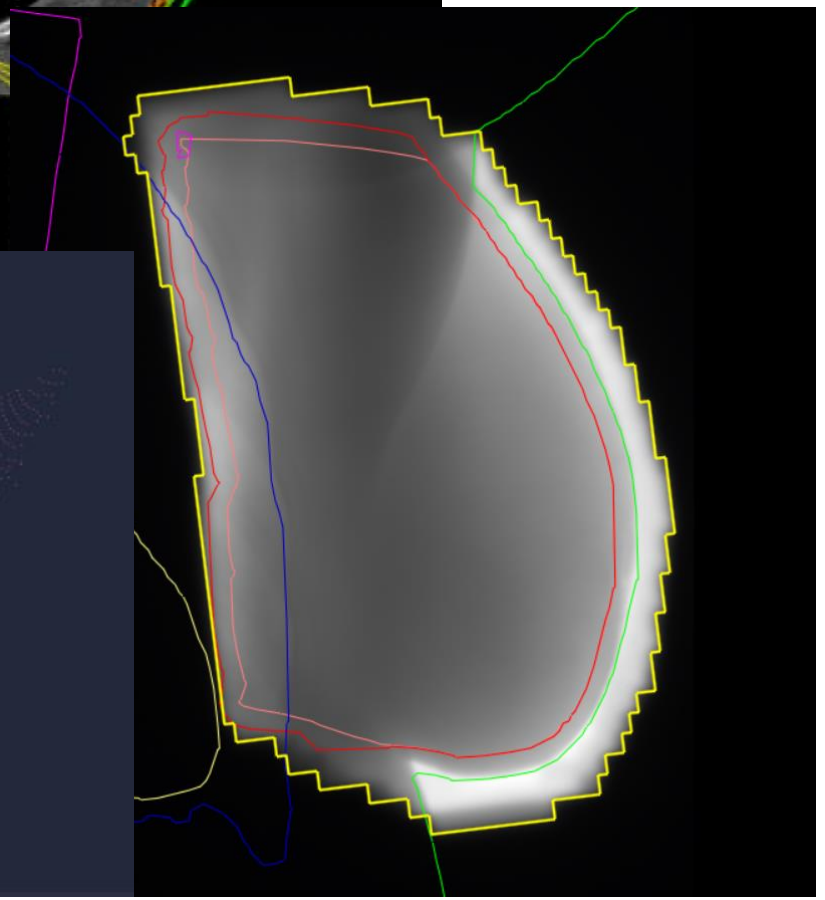
Last year

- Breast treatment on Halcyon linac









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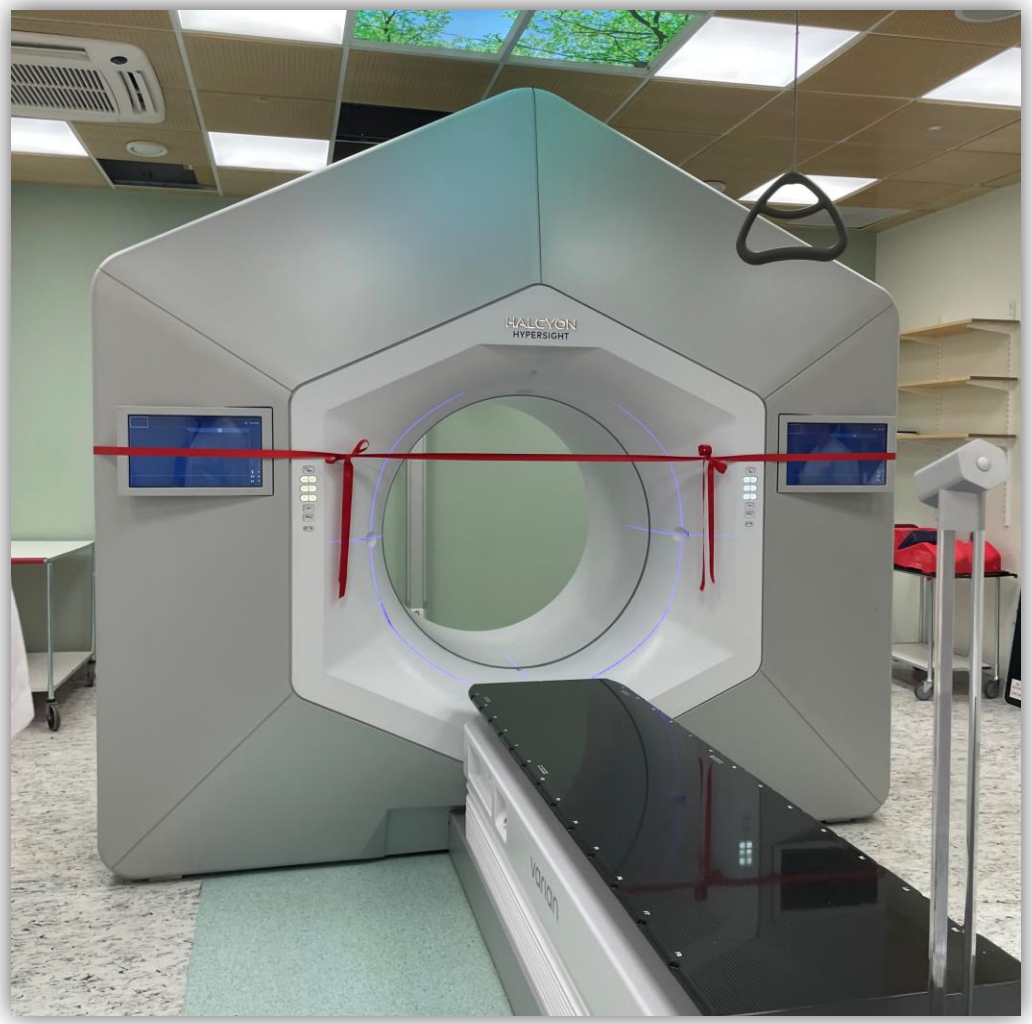
Why abdomen on Halcyon

- In March 2026 we installed our second Halcyon linac.
  - Our third O-ring linac, the first one is an Ethos.
- With HyperSight imaging.
- With AlignRT InBore.

- HyperSight gives us superior image quality compared to TrueBeam CBCT.
- Can visualize the target volume and OARs.



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Why (D)IBH for abdomen

- Stabilize the treatment site, often the diaphragm
  - Spleen can vary up to 2 cm with breathing motion
- Reduce OAR motion
  - DIBH can "squeeze" the abdominal organs together closer to IBH
    - Due to signal limitation the patient must breathe in a bit more then their natural inspiration
  - EBH potentially even better to separate OAR
- Possible to reduce margins

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Abdomen (D)IBH on Halcyon with AlignRT InBore

- Good image quality
- Isocenter placement
- No blocking but limit field of view inside bore
- Manual beam hold

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AlignRT InBore Set Up

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Patient Material

- 3 patients
  - Spleen (1.8 Gy x 17-18)
  - Stomach (3 Gy x 10)
- 44 fractions

- 3 DIBH CT and a FreeBreathing CT
- DryRun
  - For patient 1 and 2

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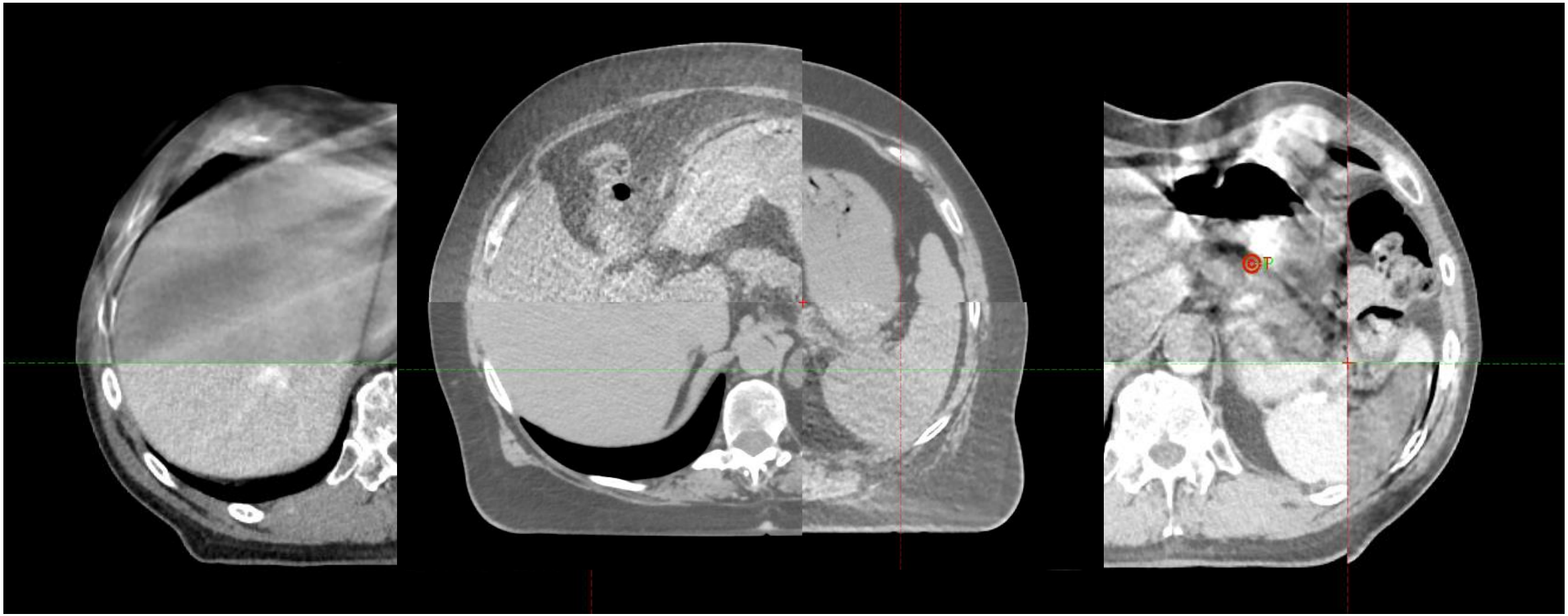
CBCT images



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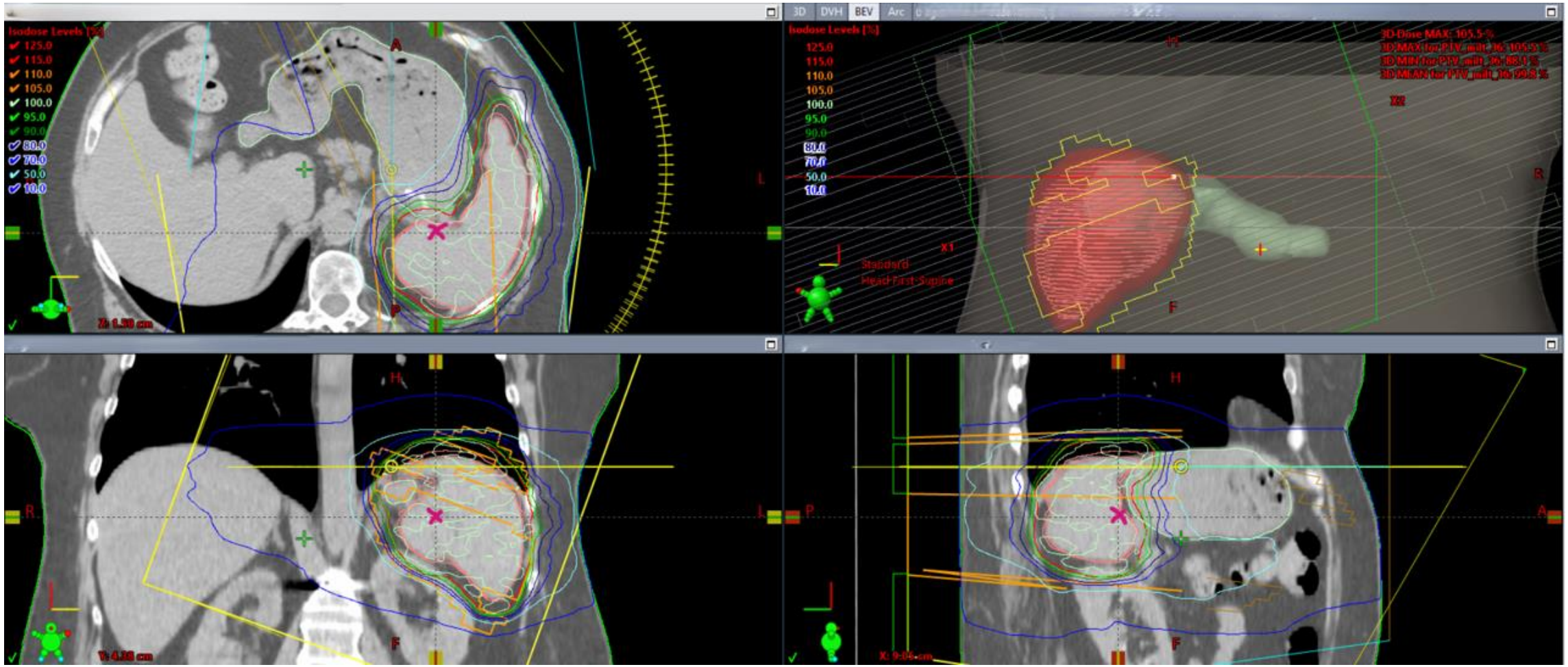
Isocenter Placement – 1



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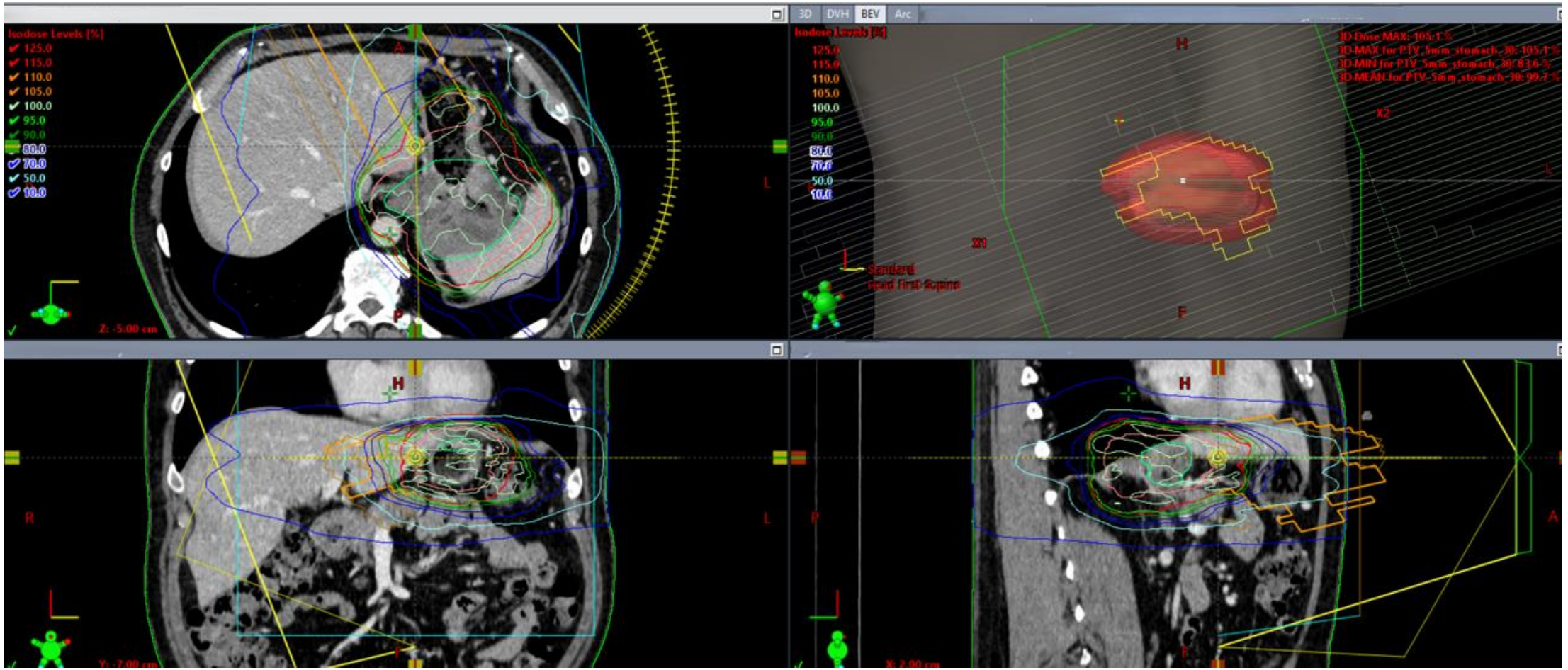
Isocenter Placement – 2



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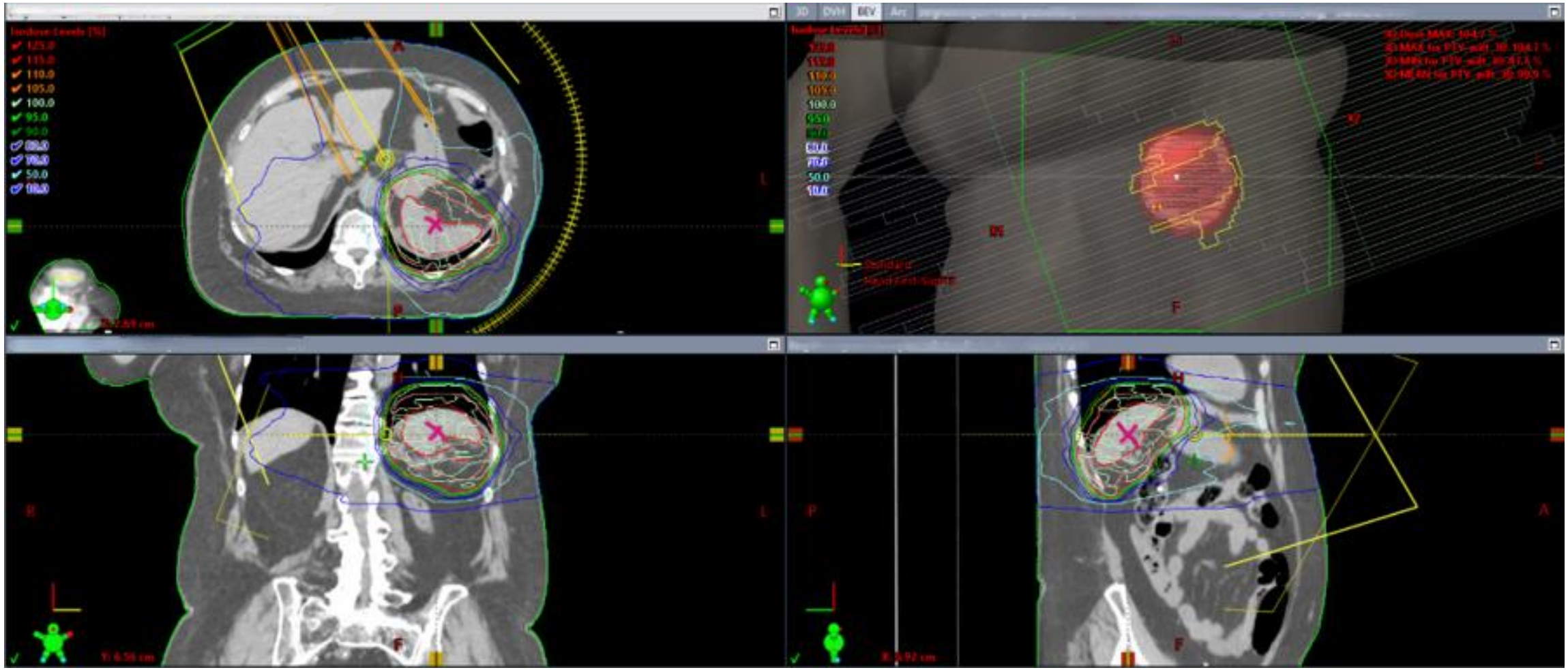
Isocenter Placement – 3



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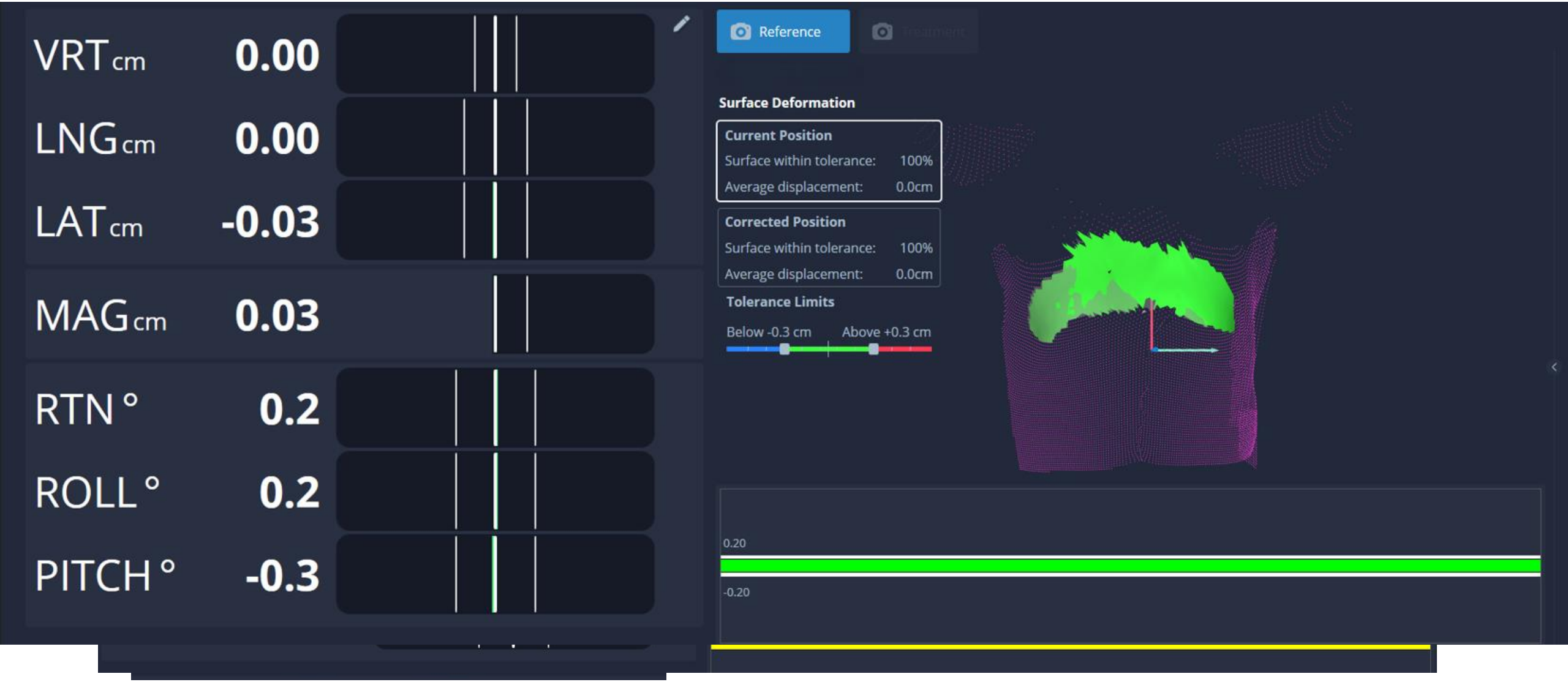

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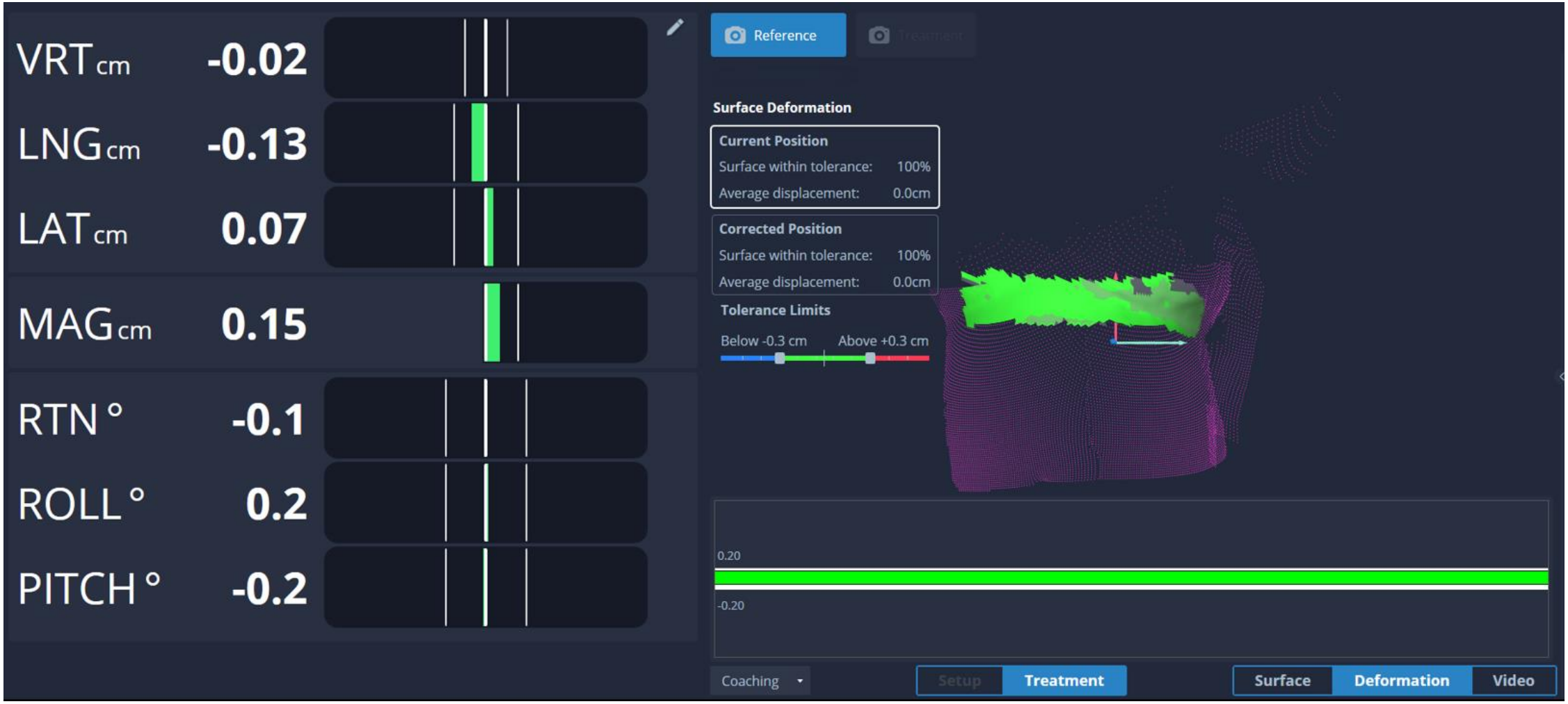
ROI for female patient



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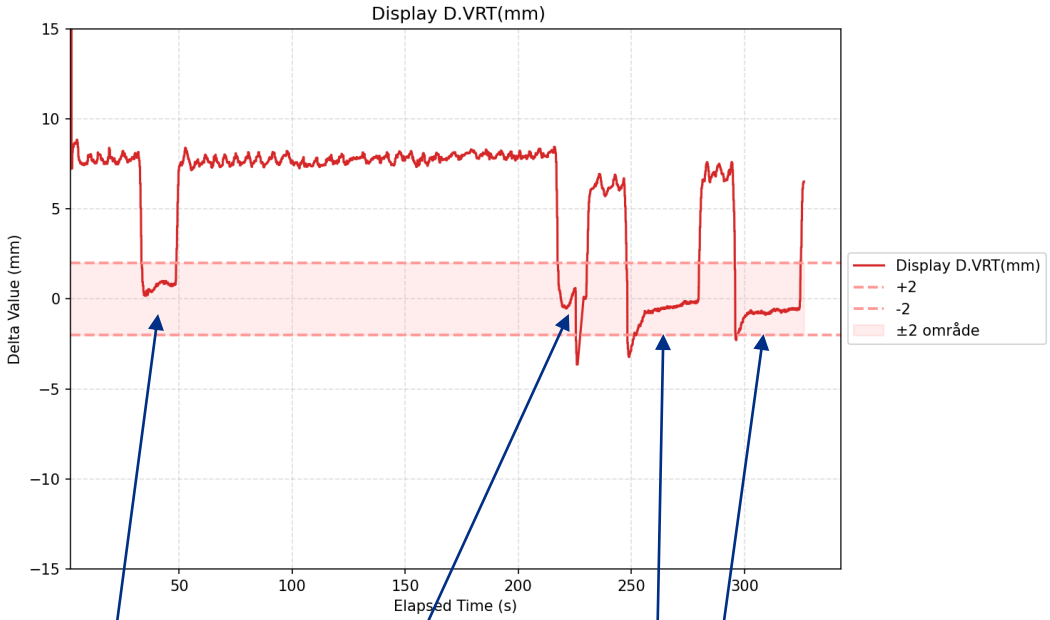
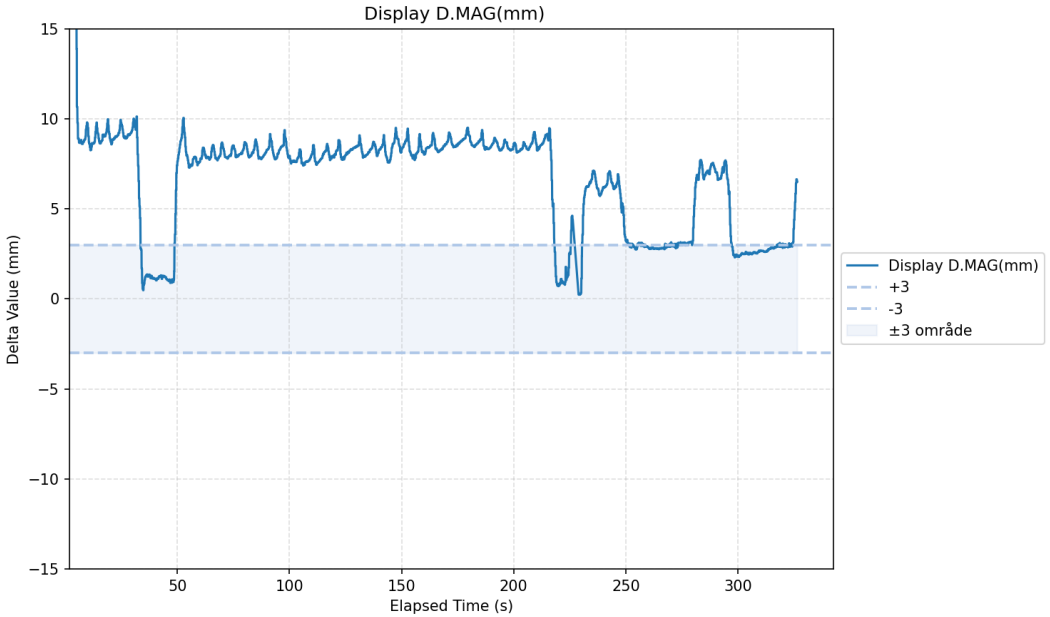
Treatment time

- Time from first CBCT begins to last treatment field is given.
- From ARIA/RT Summery.
- Average and standard deviation across fractions in table.
- 3-15 minutes
- Spleen: average 6,5 minutes (1.8Gy).
- Stomach: average 8,5 minutes (3Gy).

	Average (s)
Patient 1	392 ± 116
Patient 2	504 ± 88
Patient 3	389 ± 208

Data from AlignRT InBore, patient 1 fx. 3

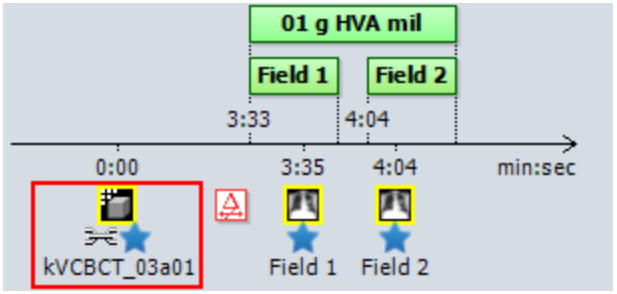




CBCT

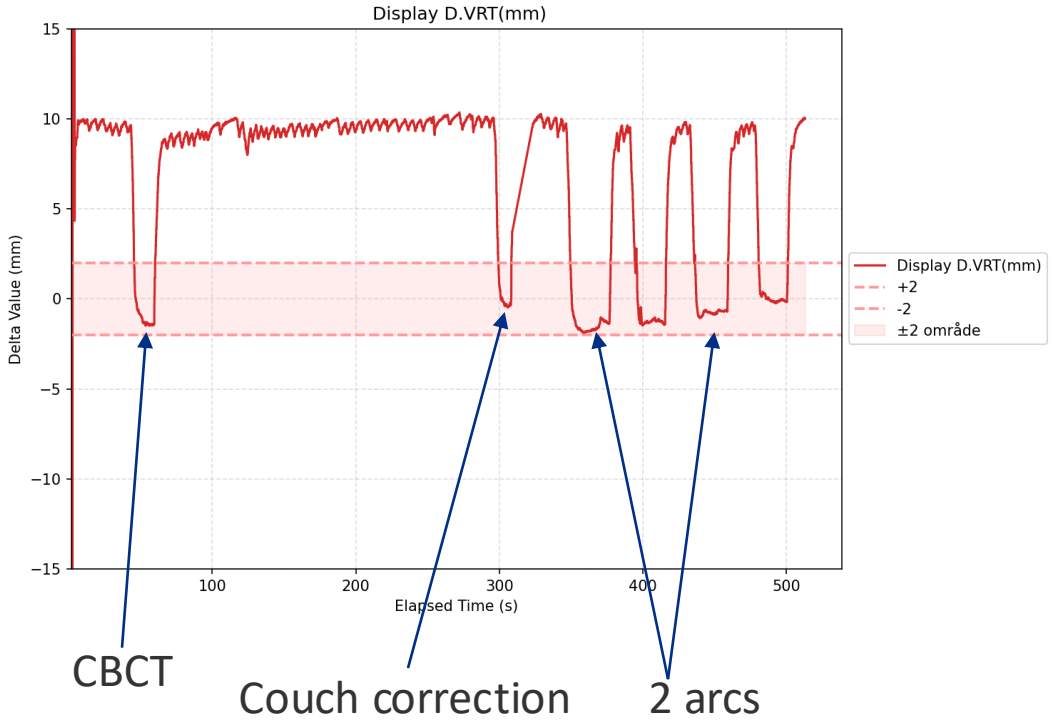
Couch correction

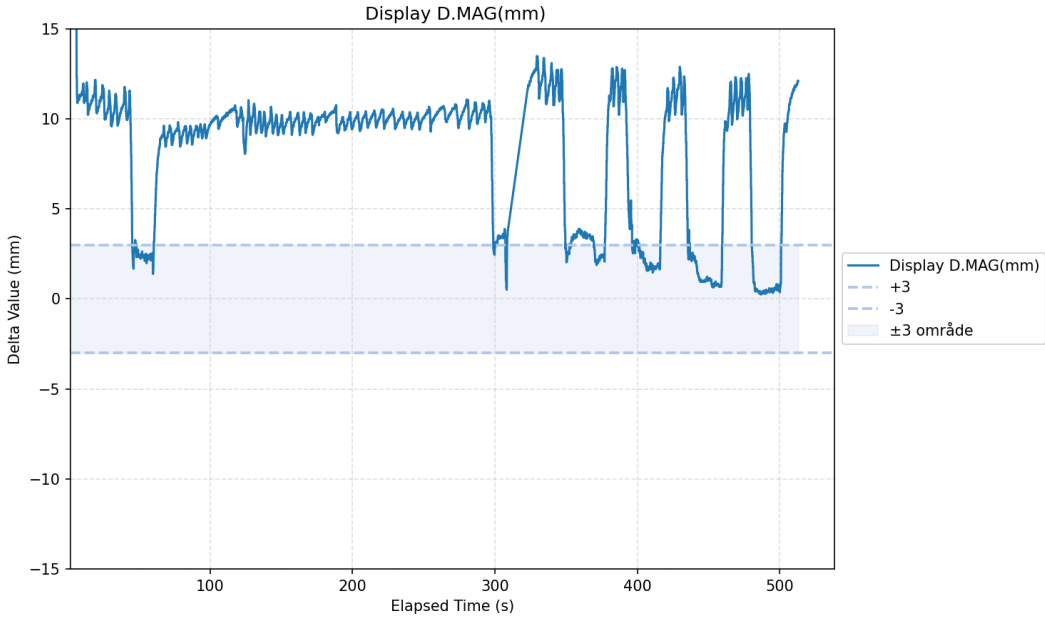
2 arcs

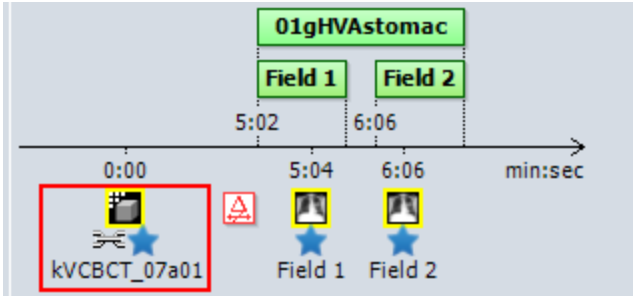


Patient who overshoots but stabilizes at correct VRT-value after less then a second.
Holds the breath for an entire half-arc.
MAG just within threshold of 3mm.

Data from AlignRT InBore, patient 2, fx. 7

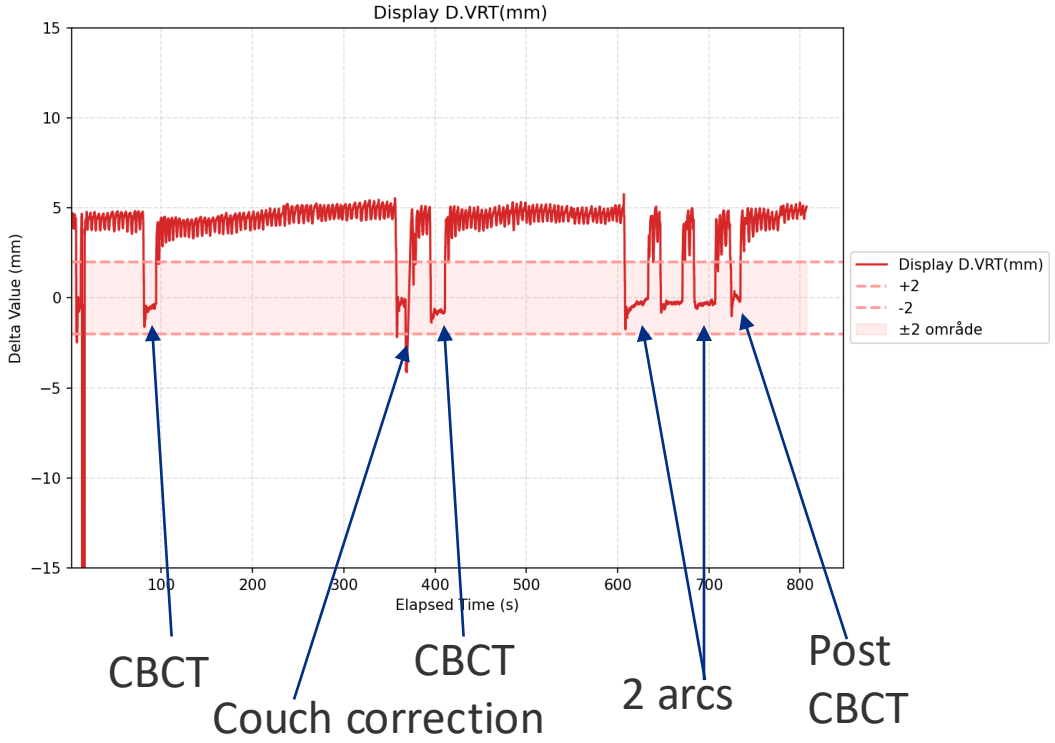


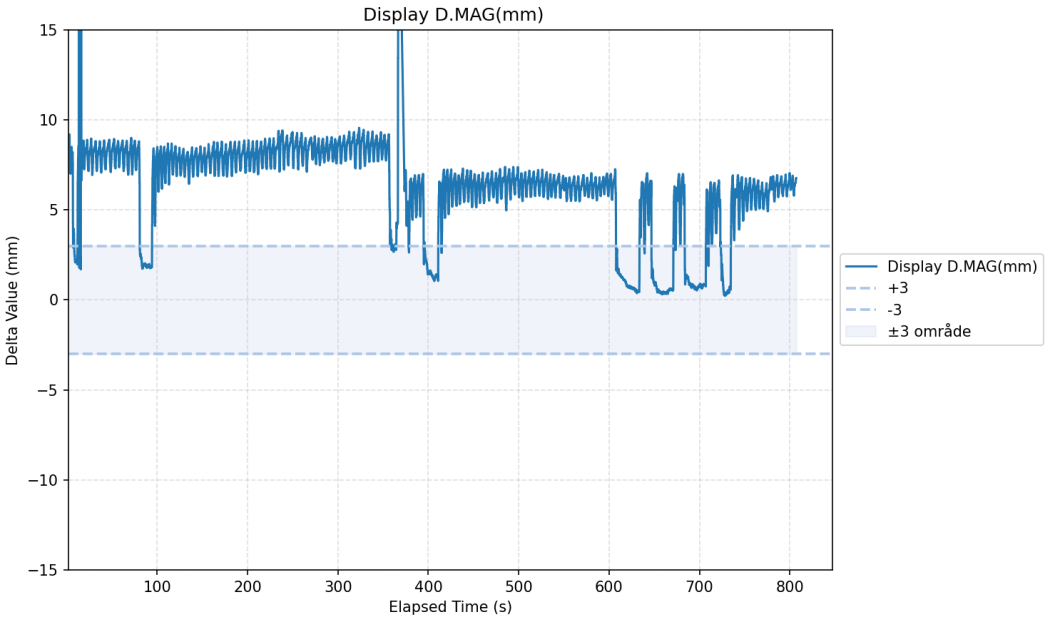


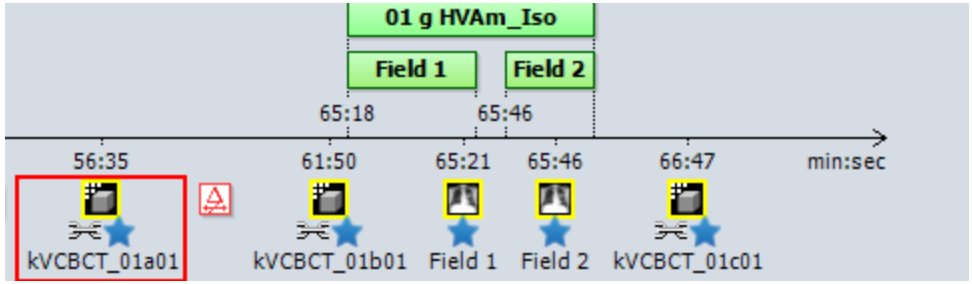


Patient had 3 Gy/fx, about 450 MU per arc. Held the breath very well but needed two breaths per arc.

Data from AlignRT InBore, patient 3, fx. 1







No DryRun. 2 CBCT before and one post CBCT.

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Personnel perspective

- No Beam Hold makes it a bit more of a challenge.
  - Not every RTT is comfortable with the workflow yet.
- Because you need to go back to set up isocenter it can be time consuming if you need to correct for “sinking”, arm position etc.
- Similar time slot needed.
- CBCT is easier without the risk of collisions.
- Image quality much better than TrueBeam.

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Conclusion

- (D)IBH on Halcyon with AlignRT InBore is feasible for patients getting radiation therapy to the abdomen.
- Care must be taken in placement of the isocenter because of the limited field of view for the InBore-cameras.
- Recommend to set up a Dry Run-appointment.

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Thank you for listening!