



Set in practice Surface Guide Radiotherapy and how it can affect on Imaging protocol.

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Objective

Surface Guided Radiation Therapy (SGRT) is a new challenging in radiation oncology facilities. AlignRT (VisionRT) is a system uses multiple stereo video camera pots to monitoring patient's position.

1. Acceptance test of SGRT system
2. End to end test
3. To validate the accuracy of SGRT setups in comparison to tattoo setups



Acceptance on Vision RT

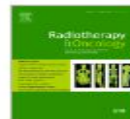
- **Thermal Stability:** Test of the thermal stability of AlignRT. A phantom is monitored for 20 minutes and the overall drift across this period is computed.
- **Delta Stability and Pod Occlusion Test:** Test of the stability of delta values when a lateral pod is occluded by the gantry head. Calculated as the difference in mean values between monitoring sessions without and with occlusion.
- **Relative Shift Accuracy Test:** Test of the accuracy of AlignRT deltas for shifts and rotations. AlignRT is used to apply the shifts accurately, and the computed average delta values can then be compared to couch readin

Review literature





Radiotherapy and Oncology

Volume 173, August 2022, Pages 188-196



Guidelines

ESTRO-ACROP guideline on surface guided radiation therapy

P. Freislederer ^{a,1}  , V. Batista ^{b,c}, M. Öllers ^d, M. Buschmann ^e, E. Steiner ^f, M. Kügele ^g, F. Fracchiolla ^h, S. Corradini ^a, M. de Smet ⁱ, F. Moura ^j, S. Perryck ^k, F. Dionisi ^l, D. Nguyen ^m, C. Bert ⁿ, J. Lehmann ^{o,p,q}

“Commissioning is part of the QA program, and it includes testing the system capabilities and verifying its accuracy/precision in all clinically relevant scenarios.”

MEDICAL PHYSICS

The International Journal of Medical Physics Research and Practice

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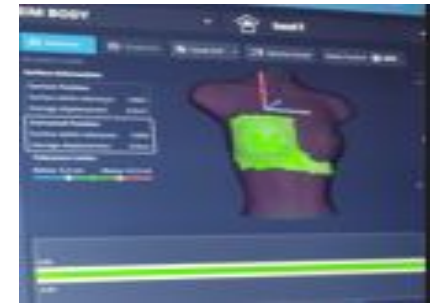
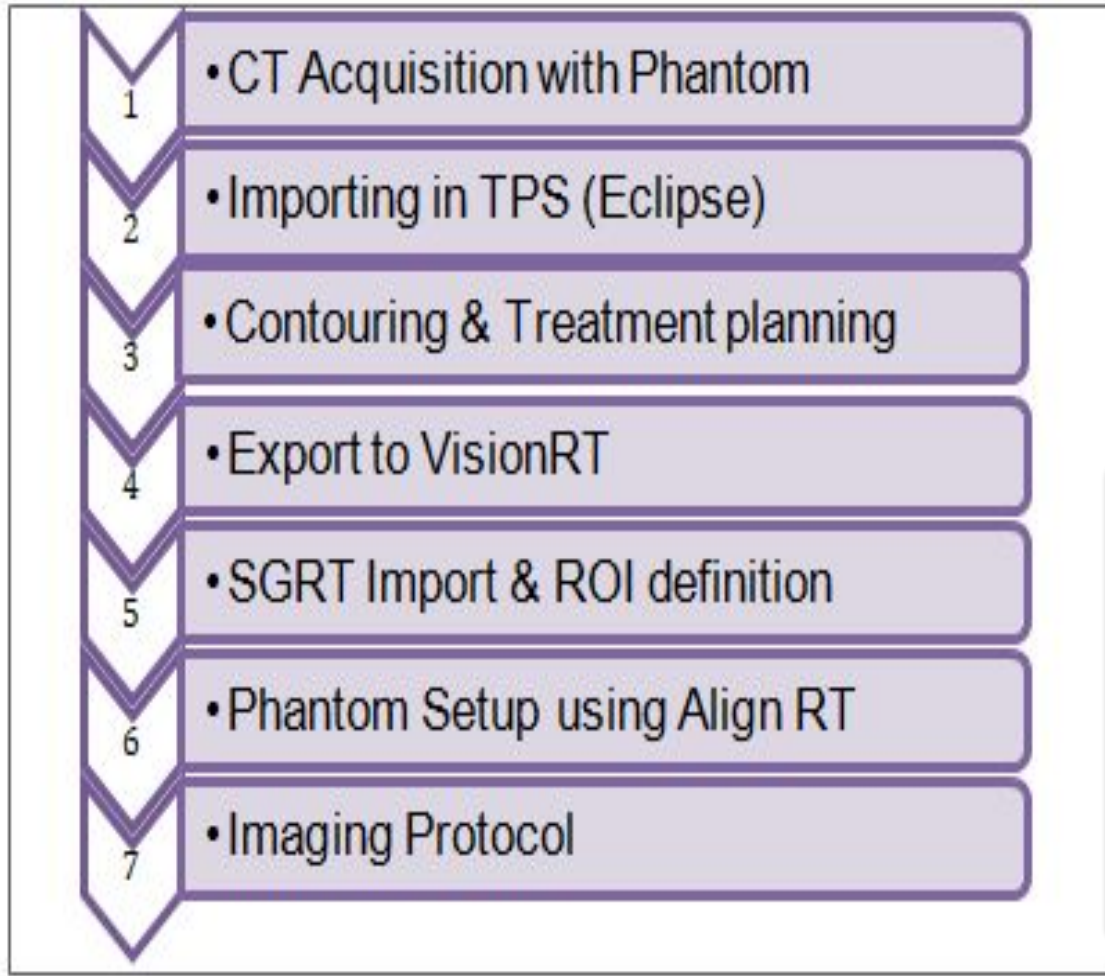
AAPM SCIENTIFIC REPORT |  Open Access | 

AAPM task group report 302: Surface-guided radiotherapy

Hania A. Al-Hallaq , Laura Cerviño, Alonso N. Gutierrez, Amanda Havnen-Smith, Susan A. Higgins, Malin Kügele, Laura Padilla, Todd Pawlicki, Nicholas Remmes, Koren Smith, Xiaoli Tang, Wolfgang A. Tomé

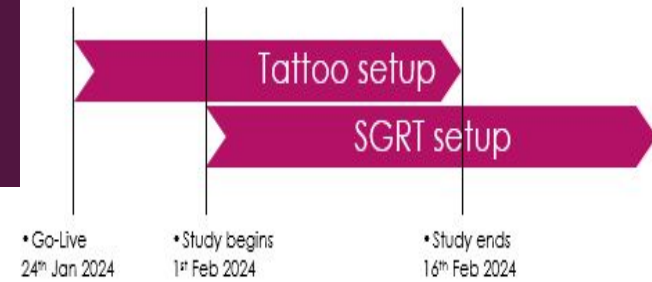
First published: 18 February 2022 | <https://doi.org/10.1002/mp.15532> | Citations: 39

End to End Testing: Method



Study Design

- 100 individual treatment sessions were randomly audited
- Patient aligned using tattoos and then planned shifts to isocentre were applied as per departmental policy
- Postural video -> RTDs recorded (positioning errors from tattoos)
- Postural video was then used to adjust for any residual corrections
- RTD values recorded (positioning errors from AlignRT)
- RTD tolerances for breast and pelvis



AlignRT RTDs when patient set up to tattoos

Vrt	Lng	Lat	Yaw	Pitch	Roll
0.54	-0.3	0.15	0.1	-0.9	0.2

AlignRT RTDs when patient set up using AlignRT

Vrt	Lng	Lat	Yaw	Pitch	Roll
0.06	-0.35	0.01	0.3	-0.4	-0.2

VS

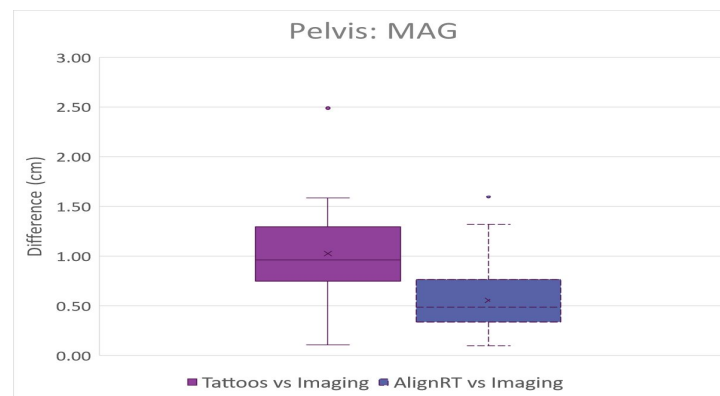
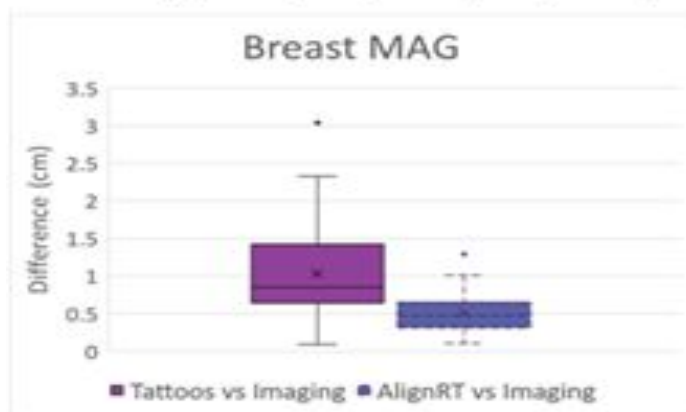
Shifts from Imaging

Vrt	Lng	Lat	Yaw	Pitch	Roll
-0.09	-0.16	0.21	-0.2	-0.2	0.7

Analysis & Results:

- Tattoo vs imaging = Difference between tattoo RTDs and imaging shifts (VRT,LAT,LNG)
- AlignRT vs imaging = Difference between AlignRTDs and imaging shifts (VRT,LAT,LNG)
- 3D vector shifts/MAG

$$MAG = \sqrt{(\Delta VRT)^2 + (\Delta LAT)^2 + (\Delta LNG)^2}$$



• More than 1 cm translational shift?

	MAG
Tattoo vs imaging	1 +/- 0.6 cm
AlignRT vs imaging	0.5 +/- 0.3 cm
P-value	<0.05

	Tattoo	SGRT
Pelvis	12 (30%)	3 (8%)
Breast	14 (34%)	1 (2%)

Conclusion

- **AlignRT system is sufficiently verified for clinical use**
- **Quantitative evaluation of system and baseline for routine QA**
- **Robustness of patient setups v/s SGRT for breast and pelvis cases =>**
Tattooless!
- **SGRT alignment led to significantly smaller 3D vector correction shifts**
- **Less patients requiring correctional shifts?**
- **Less patients requiring repeat imaging**
- **Less rescan due to Set Up issues**
- **Changing Imaging protocol for Breast patients to:**
 - **Imaging first 3 fraction, if trend is consistence, move to weekly imaging**
 - **CBCT for all VMAT plan.**

Thank you



Question?