

THE 2026 US SGRT  
COMMUNITY MEETING

A WHOLE NEW WORLD OF SGRT



# Stability and Reproducibility of Extended Region of Interest for Surface Guided Proton Therapy

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# Stability and reproducibility of extended ROI for surface-guided proton therapy

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# Objectives

1. Understand the challenges of implementing SGRT in proton therapy
2. Explore the impact of ROI design on SGRT in proton therapy
3. Evaluate the effectiveness of extended ROIs in maintaining stable and reproducible surface tracking

# Inova Health System

- Schar Cancer Institute
  - Department of Advanced Radiation Oncology and Proton Therapy
    - Loudoun
    - Fair Oaks
    - Fairfax
    - Alexandria
    - Potomac

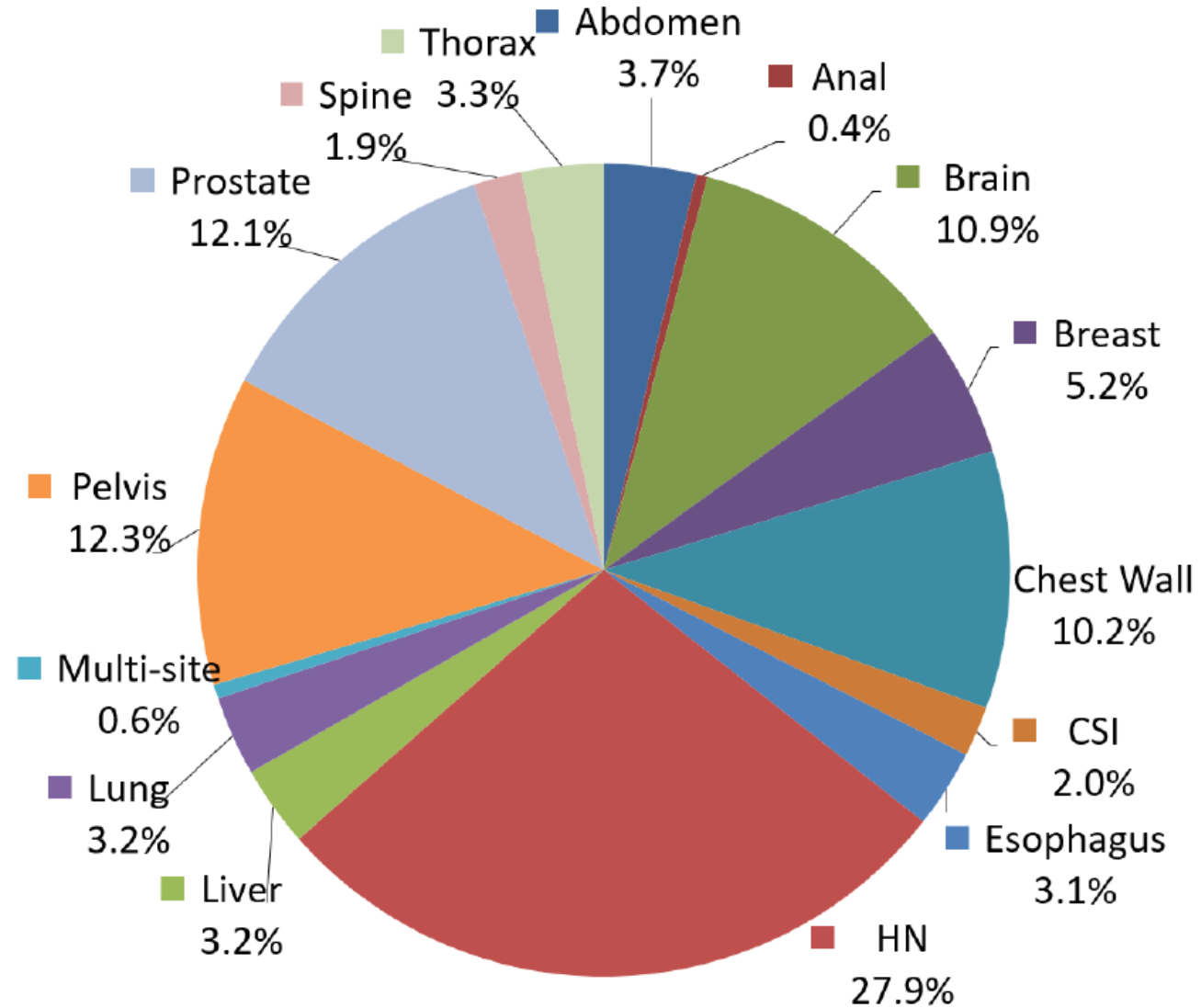


1. Loudoun Hospital
2. Ashburn HealthPlex
3. Reston/Herndon
4. Fair Oaks Hospital
5. Fairfax Hospital
6. Fairfax City
7. Alexandria Hospital
8. Oakville at Potomac Yard
9. Mount Vernon Hospital
10. Springfield Hospital
11. Lorton HealthPlex

# Inova Schar Cancer Institute

- IBA Proteus Plus
- Two rotating gantry treatment rooms
- Pencil beam scanning with small spot size
- 6D robotic arm couch
- Dual kV and CBCT OBI system
- 30 x 40 cm<sup>2</sup> treatment field
- SDX breath-hold capability
- Integrated AlignRT surface guidance





More than 1200 patients have been treated since opening in March 2020.

# Surface-Guided Proton Therapy

- **SGRT plays a key role in daily patient setup.**
  - Improved efficiency in patient setup
  - Elimination of skin marks/tattoos
  - Streamlined clinical workflow



Initial setup with SGRT

CBCT

Capture a new surface  
reference

Continuous monitoring  
during treatment

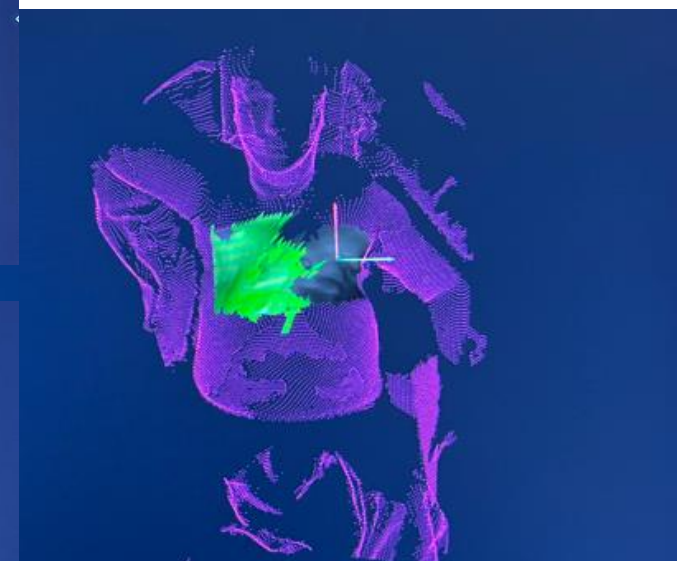
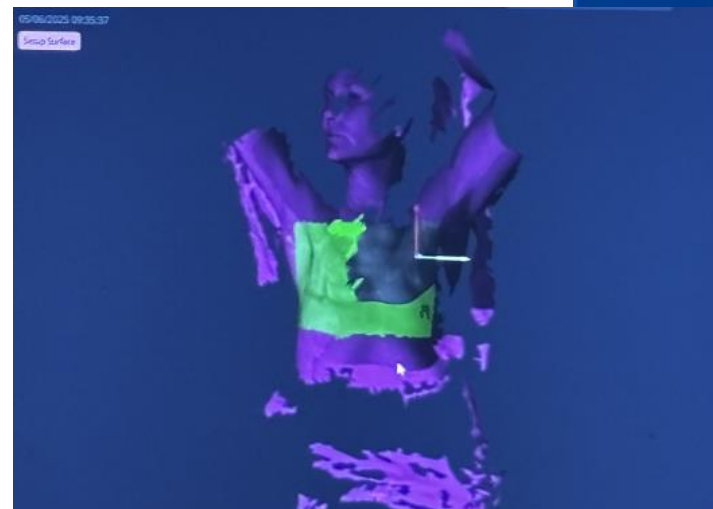
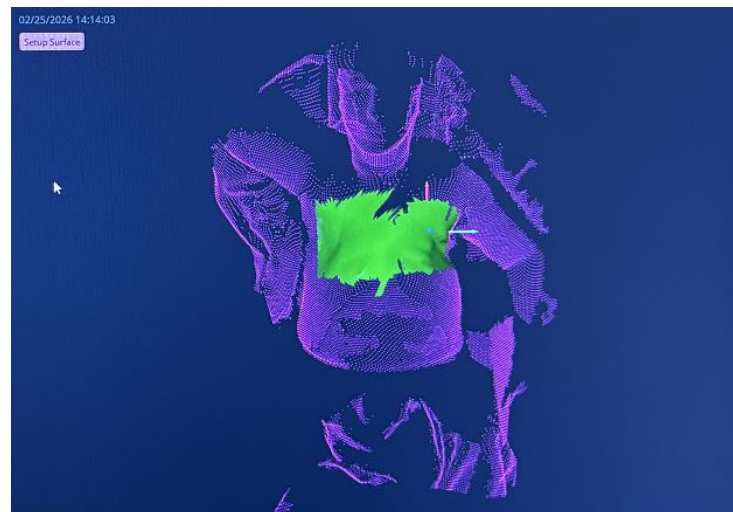
# Challenges with SGPT



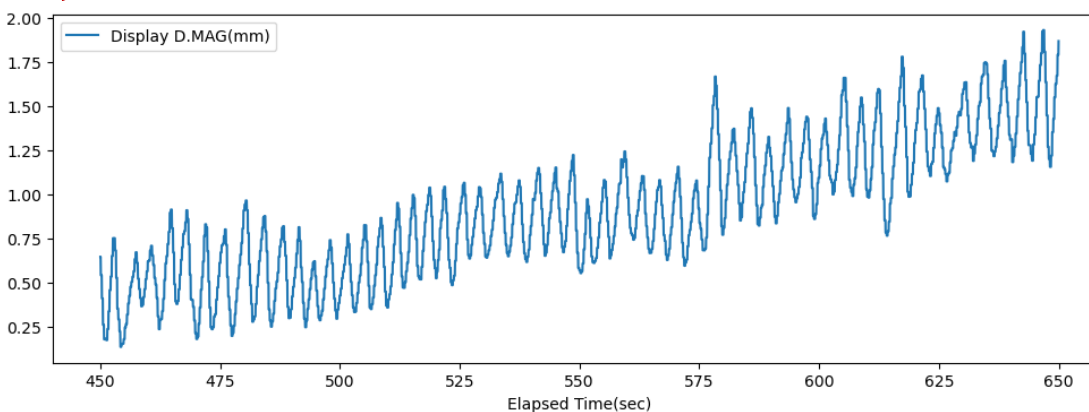
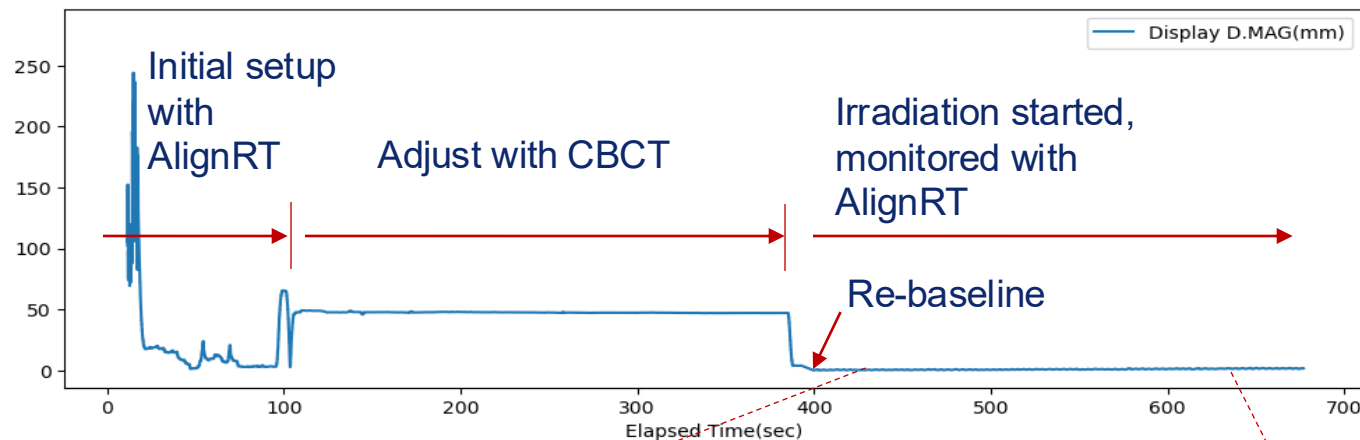
- Gantry-induced occlusion of the camera's field of view
  - Reduced surface tracking continuity
  - Reduced accuracy in treatment monitoring
  - Prolonged treatment duration
  - Increased reliance on image guidance
  - Potential interruptions during treatment delivery

# Extended Region of Interest

- ROI was expanded to include surfaces adjacent to the treatment site.
- Four patient groups were examined:
  - Thorax
  - Pelvis
  - Prostate
  - Breast/CW



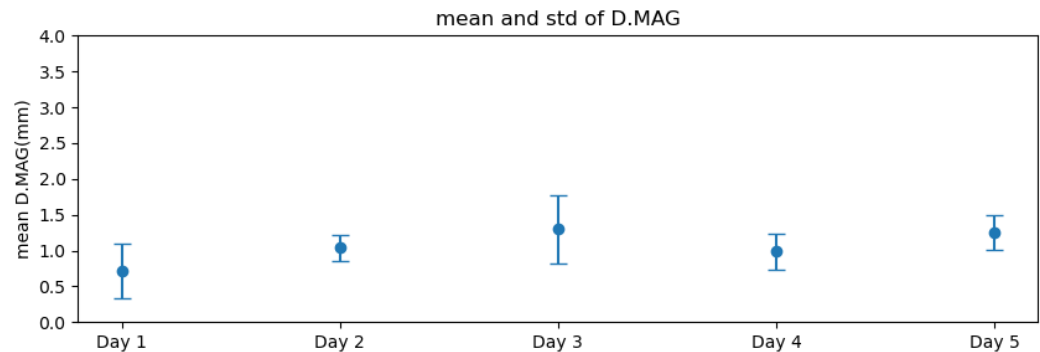
# Analysis of Real Time Delta Data



# Results: CW/Breast Patients

## Inter-fraction

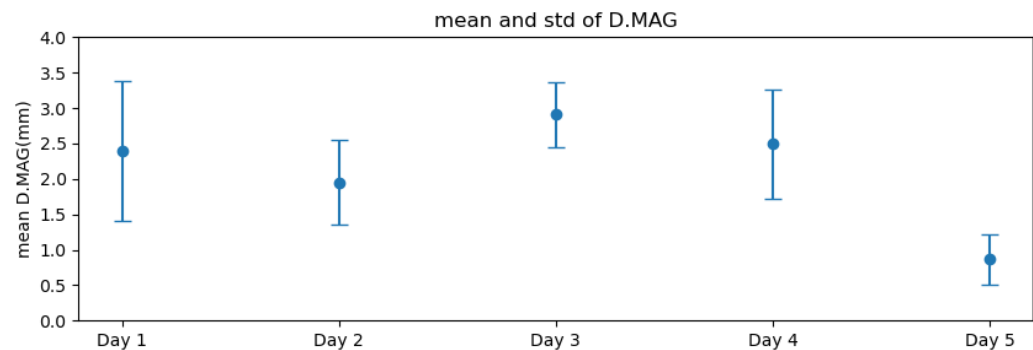
Patient 1



Mean: 1.06

SEM: 0.21

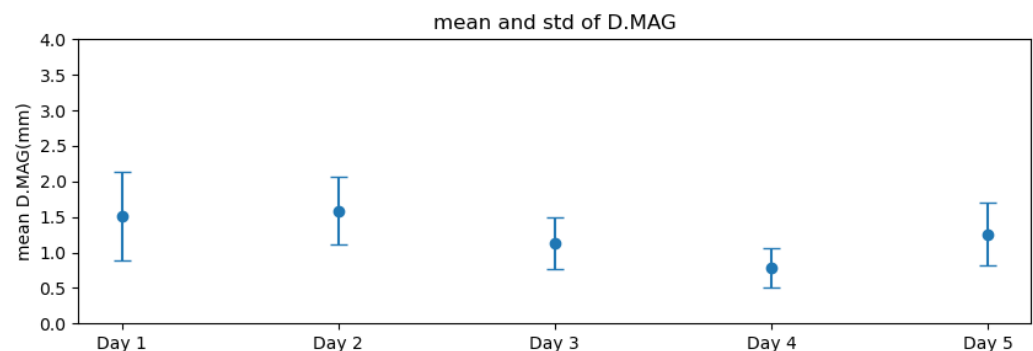
Patient 2



Mean: 2.12

SEM: 0.21

Patient 3

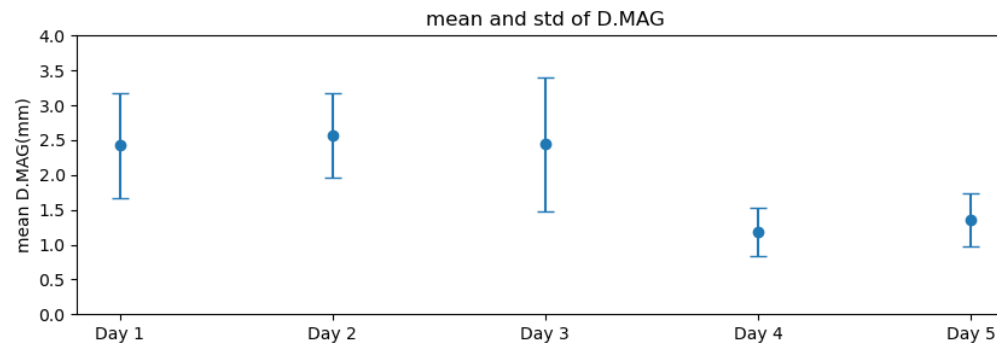


Mean: 1.25

SEM: 0.29

# Results: Thorax Patients

Patient 1

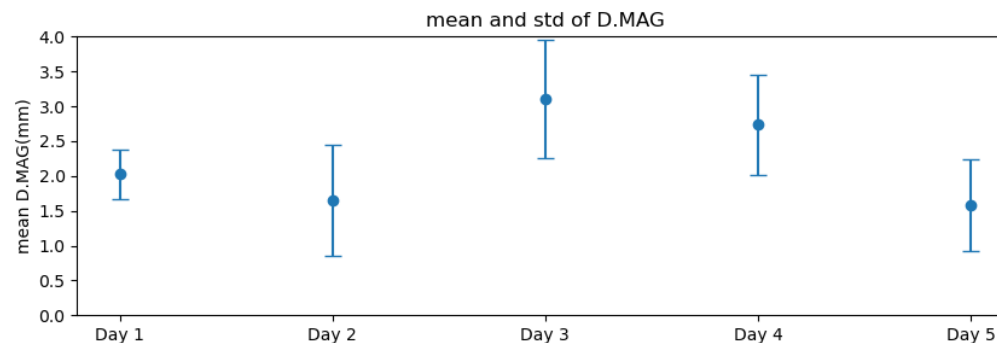


Inter-fraction

Mean: 1.99

SEM: 0.59

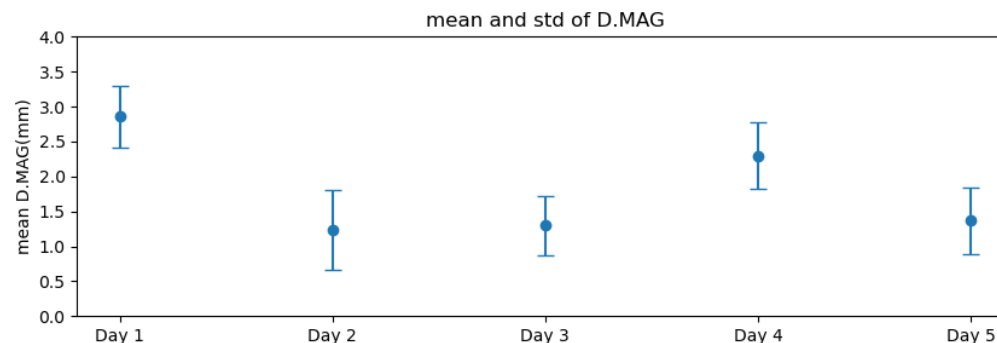
Patient 2



Mean: 2.22

SEM: 0.60

Patient 3

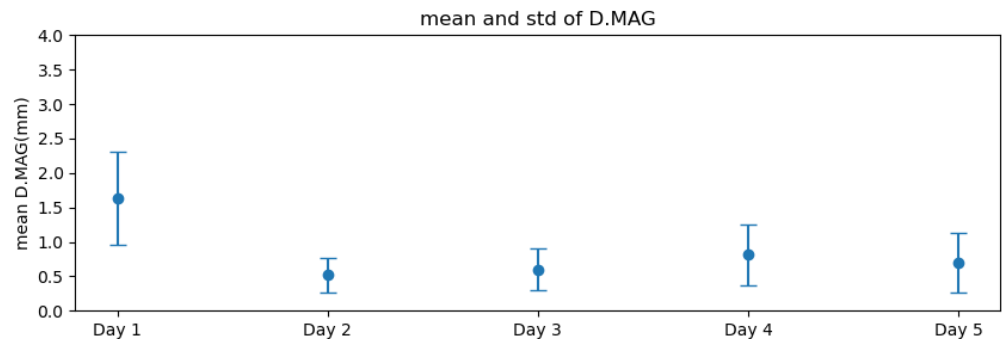


Mean: 1.81

SEM: 0.65

# Results: Pelvis Patients

Patient 1

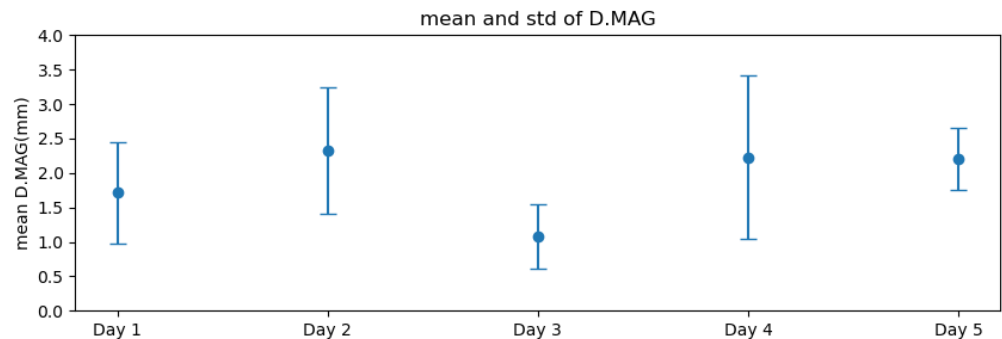


Inter-fraction

Mean: 0.85

SEM: 0.40

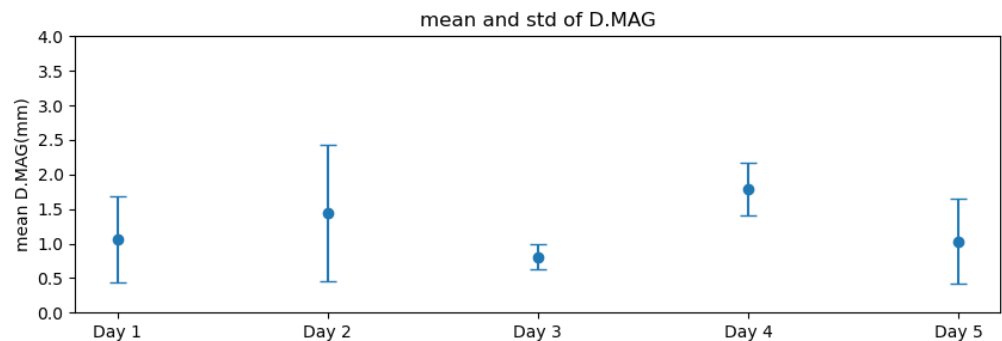
Patient 2



Mean: 1.91

SEM: 0.47

Patient 3

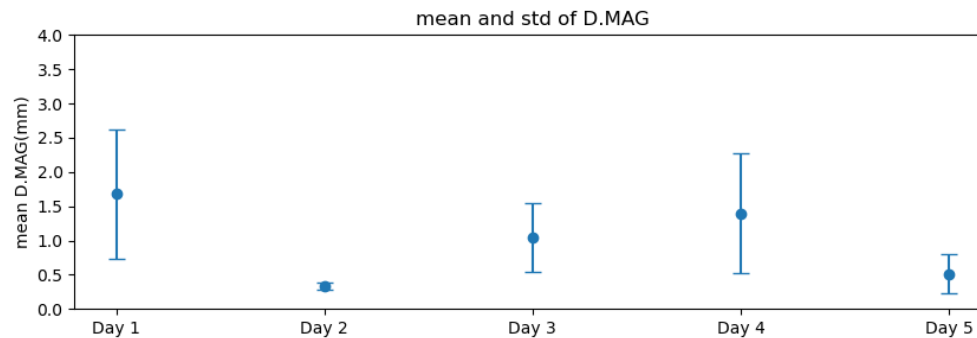


Mean: 1.23

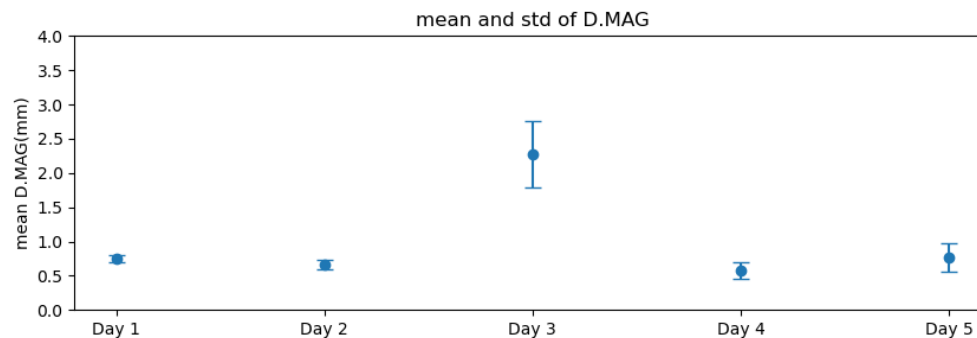
SEM: 0.35

# Results: Prostate Patients

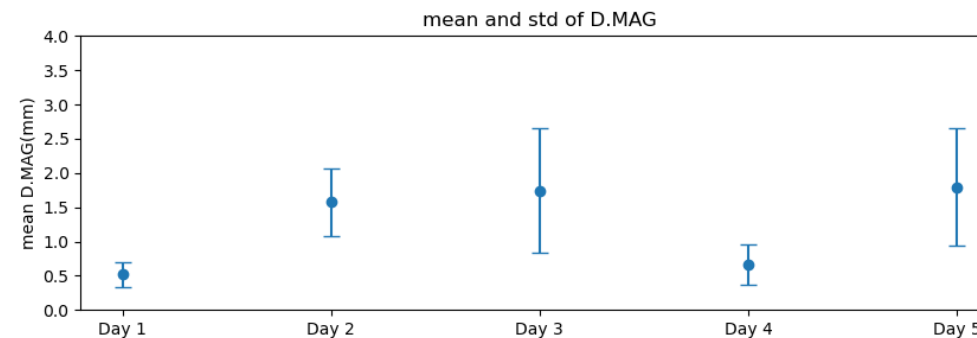
Patient 1



Patient 2



Patient 3



Inter-fraction

Mean: 0.99

SEM: 0.51

Mean: 1.01

SEM: 0.64

Mean: 1.26

SEM: 0.55

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# Summary

- SGRT provides precise patient positioning and real-time treatment monitoring without compromising workflow efficiency.
- Gantry-induced occlusion of the SGRT cameras is a major challenge in proton therapy. Extended ROIs demonstrate reliable stability and reproducibility intra- and inter-fractionally.
- Future studies will explore the application of SGRT for beam gating in proton therapy and evaluate its performance compared to other breath-hold methods.

Thank you

