SGRT for paediatrics: Peter Mac's experience

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Introduction

PAEDIATRIC RADIATION THERAPY AT PETER MAC

- ~80 paediatric patients treated annually
- Treatment sites include CSI, Brain, H&N, Chest, Abdomen, Extremity, TBI
- ~50% require thermoplastic mask for stabilisation
- Significant procedural anxiety
  - Virtual Reality
  - Music Therapy
  - Play Therapy
  - Masks Painting
  - Paediatric Film Creation
  - Projection Art
- ~30% require general anaesthetic

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Introduction

BACKGROUND

- SGRT is advantageous for many indications, however, may be particularly beneficial in the paediatric cohort.
- Survival rates for paediatric patients continue to increase and the manifestation of late side effects is of concern
- Need for optimal treatment accuracy and safety.
- Acute distress is common in paediatric patients and remaining still during setup and treatment can be particularly challenging
- Active patient monitoring is therefore particularly powerful and allows reduced stabilisation requirements that may improve patient experience
- Distress is also significant in the parents or guardians of children receiving radiation therapy
- The provision of information about SGRT systems and their advantages may help provide extra reassurance to parents about their child's safety, and subsequently reduce anxiety and distress

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Introduction

BACKGROUND

- SGRT ideal for paediatric patients – constant active monitoring, mark-free setups
- AlignRT introduced to paediatric treatments at VCCC in September 2022

PROJECT AIMS

- Assess Radiation Therapist (RT) opinion of SGRT with paediatric patients
- Assess impact of SGRT on setup time, IGRT time, setup accuracy

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Qualitative research

Radiation Therapist opinion of Paediatric SGRT

- Semi-structured focus group (1hr) with RTs from PMCC, Parkville familiar with treating paediatric patients with SGRT
- Electronic survey (Likert-scale questions)

- 18 RTs identified as eligible to participate
- 7 participated in the focus group, 12 completed the survey
    - Grades 1-4
    - 1-17 years qualified
    - Beginner – Expert users

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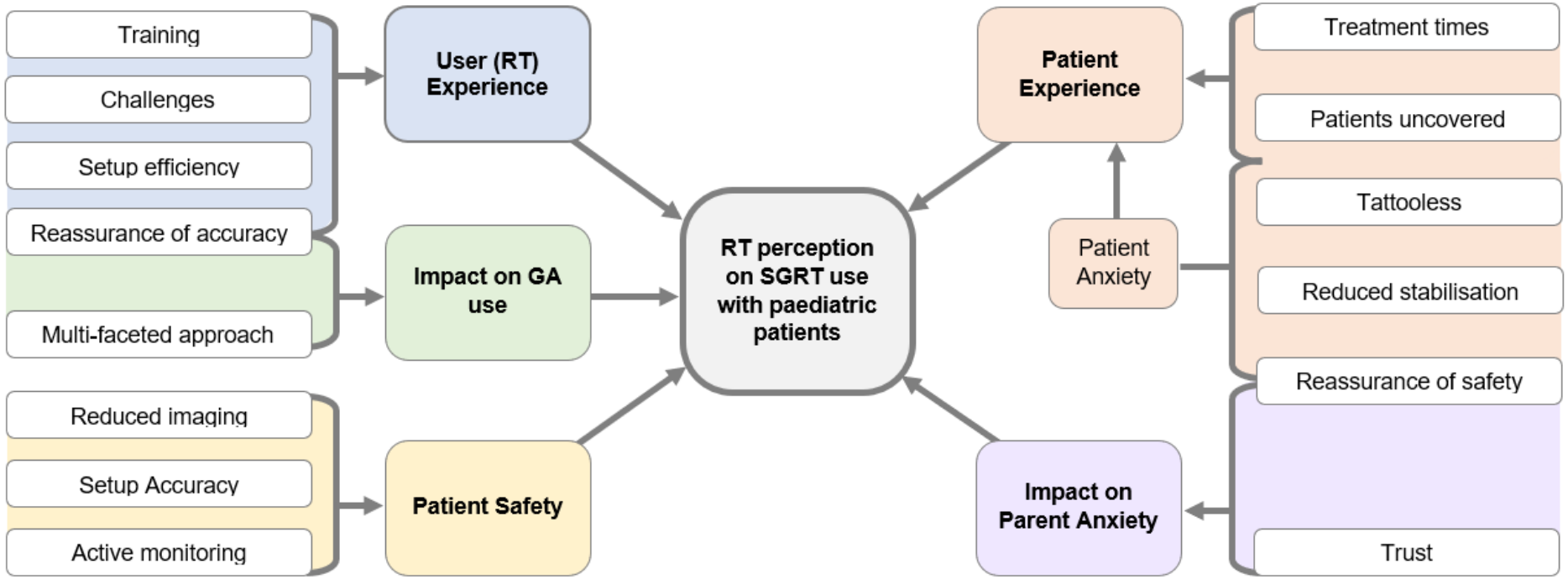
Results

Radiation Therapist opinion of Paediatric SGRT

- 14 codes, 5 themes identified



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Results

- RT perceptions of SGRT use with paediatrics were largely positive across the different themes with some areas for improvement

PATIENT EXPERIENCE

- 5/14 of the identified codes were grouped into the theme of patient experience, with patient anxiety arising as a sub-theme
- Patient experience included the removal of tattoos and reference marks and the reduction in treatment times
- The option to provide open-face thermoplastic masks was also described as a way to reduce anxiety associated with closed-face masks
- SGRT requires at least a portion of the patient to be uncovered to allow adequate surface monitoring
- Reassurance of patient safety was a common point of discussion with the participants
- Directly reducing patient anxiety in older children capable of understanding

PARENT ANXIETY

- Helps provide parents with reassurance of treatment accuracy and creates a sense of trust in the system which indirectly can reduce younger patients' anxiety

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Results

IMPACT ON GA USE

- SGRT was highlighted as an additional safety net, capable of aiding in the removal of GA requirements in some patients
- Patients that could benefit from this intervention were described by participants as those who were “borderline”
- The potential to reduce GA use is an exciting prospect made possible with SGRT

USER (RT) EXPERIENCE

- Faster setup and treatment times impacts both patient and user experience
- A significant learning curve was associated with treating paediatric patients with SGRT
- Participants noted the importance of education and training requirements, however currently, no specific paediatric SGRT training material exists at our centre, and SGRT training is more generalised to an adult population

PATIENT SAFETY

- SGRT can reduce the amount of repeat imaging required for patients by more accurately guiding patient setup
- More accurate than traditional setups and can reduce magnitude of on-line corrections

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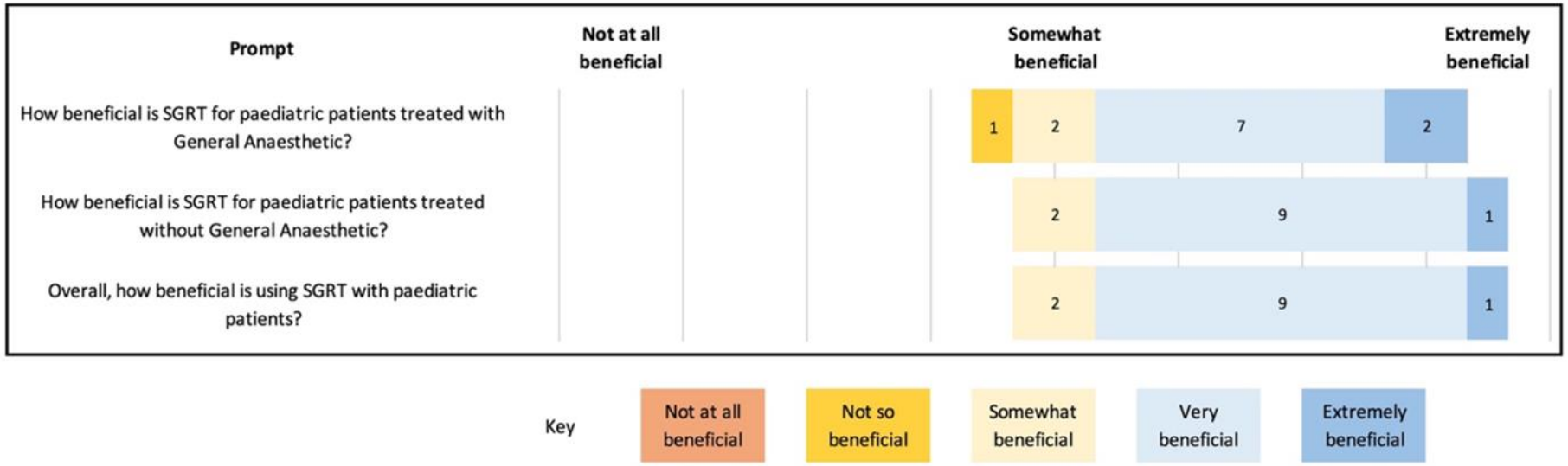
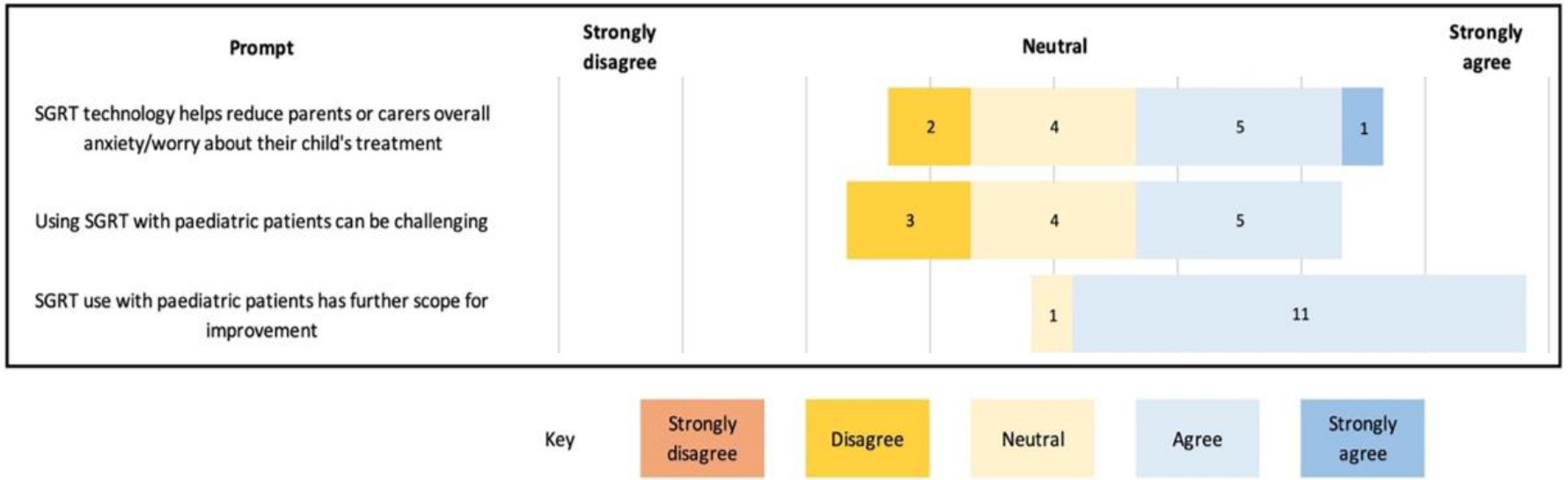
Results





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Quantitative Research

- Retrospective analysis of paediatric patients (0-17 years)
  - SGRT- (2021)
  - SGRT+ (2023)

- Raw data collected from TrueBeam log files, including timestamps for all treatment events, OLCs

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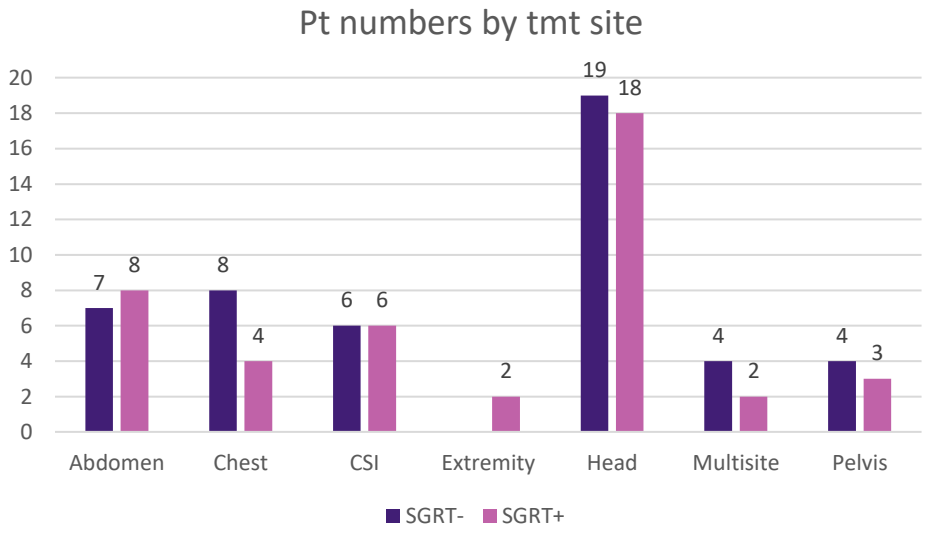
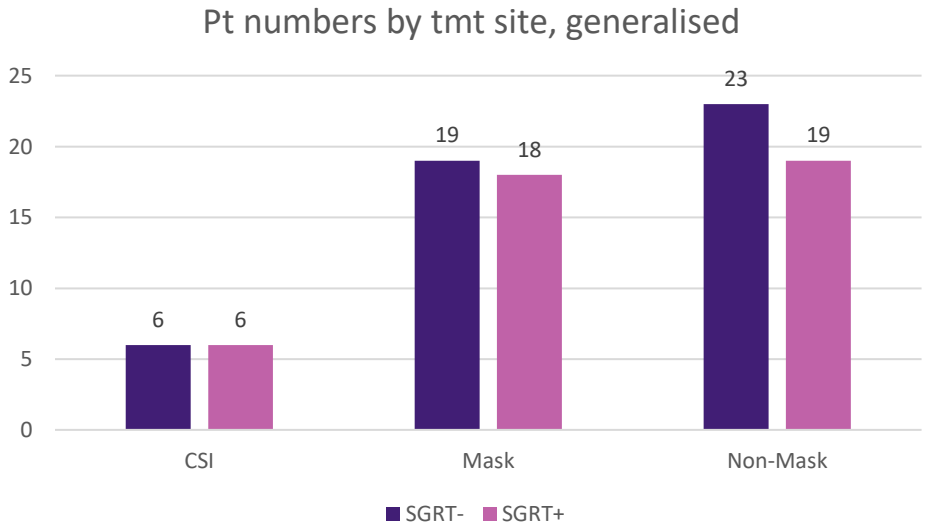
Results

Retrospective cohort (SGRT-)

- N = 48, total 1054 fractions
- Ages = 1-17yrs (avg. 9.3yrs)

- Prospective cohort (SGRT+)
- N = 43, total 922 fractions
- Ages = 8mths-16yrs (avg. 7.2yrs)





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Results

- Improvements to setup time, IGRT time and overall tmt time with SGRT

	Mask			Non Mask			CSI		
	SGRT- (mins)	SGRT+ (mins)	Δ (mins)	SGRT- (mins)	SGRT+ (mins)	Δ (mins)	SGRT- (mins)	SGRT+ (mins)	Δ (mins)
Setup time	03:04	02:20	-00:44	07:13	03:26	-03:47	08:00	06:28	-01:32
IGRT time	01:54	01:19	-00:35	02:15	02:05	-00:10	11:59	05:05	-06:54
Tmt time	02:51	03:41	+00:50	03:02	03:23	+00:21	23:26	19:17	-04:09
Total time	08:41	07:15	-00:29	15:05	09:55	-03:36	43:25	30:50	-12:35

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Results

- Increase in tmt time seen due to AlignRT active monitoring?

	Mask			Non Mask			CSI		
	SGRT- (mins)	SGRT+ (mins)	Δ (mins)	SGRT- (mins)	SGRT+ (mins)	Δ (mins)	SGRT- (mins)	SGRT+ (mins)	Δ (mins)
Setup time	03:04	02:20	-00:44	07:13	03:26	-03:47	08:00	06:28	-01:32
IGRT time	01:54	01:19	-00:35	02:15	02:05	-00:10	11:59	05:05	-06:54
Tmt time	02:51	03:41	+00:50	03:02	03:23	+00:21	23:26	19:17	-04:09
Total time	08:41	07:15	-00:29	15:05	09:55	-03:36	43:25	30:50	-12:35

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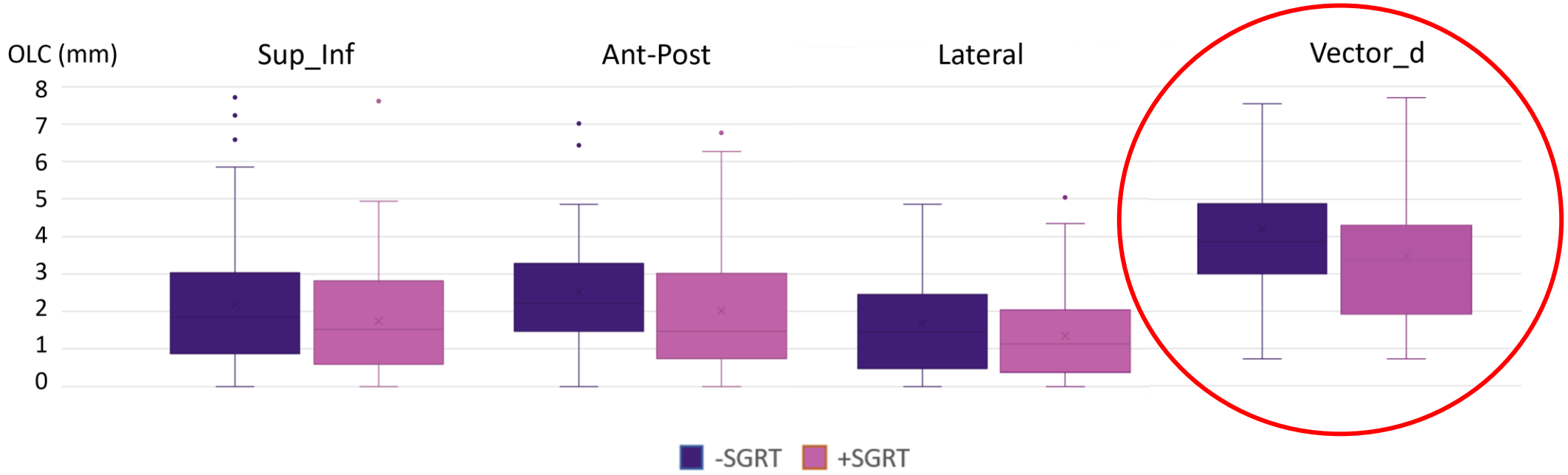
Results

- Improvements to setup accuracy in CSI patients
- Mean online correction (OLC) reduced in all translational planes



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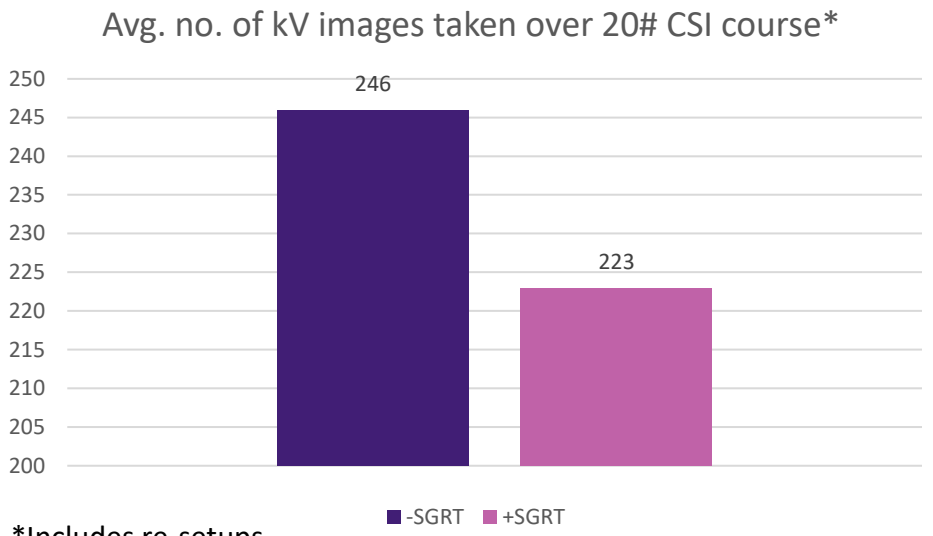
Results

- Improvements to setup accuracy in CSI patients
- Reduction in the number of re-setups due to inaccurate positioning

CSI no. of fractions with re-setups*			
	Re-setups	Total fractions	% of fractions
-SGRT	36	113	31.86%
+SGRT	15	73	20.55%

*doesn't factor in more than one re-setup on same day



*Includes re-setups

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Conclusion

- SGRT improves efficiency, accuracy and safety of paediatric radiation therapy treatments
- User opinion is positive and reflects the quantitative data
- Paediatric specific training and education are necessary

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Thank you for your attention

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