Figure 1: Patient Receiving Radiotherapy [1]

South Eastern Sydney Local Health District

The Role of SGRT in the Setup of Paediatric Craniospinal Treatment

A Case Study

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Background

6-Year-Old Child

Diagnosed with Fourth Ventricular Medulloblastoma

Surgical resection of the tumour

23.4Gy/ 13# to craniospine

30.6 Gy / 17# boost to posterior fossa

Very energetic and excitable personality

Supporting Literature and Research

Freislederer et al. (2020) [2]

- Reviews use of SGRT in paediatric patients
- Minimally used, limited literature
- Primary use to provide error protection and assist in setup

Seravalli et al. (2024) [3]

- Survey aiming to gain information on paediatric centres utilising SGRT
- 43% of paediatric radiation oncology centres using SGRT for paediatrics
- Benefits include improved monitoring and increased patient comfort

Cumming et al. (2020) [4]

- Study analysing the use of SGRT for paediatric patients
- Compared patients treated with vs. without SGRT
- Craniospinal treatment times reduced by 8 minutes and re-setups reduced by 58%

Simulation

- Head-first prone
- Double shell mask
- Full body vacbag
- Marks on mask at VBL
- Marks on vacbag at natal cleft

Figure 2: Patient during simulation appointment

Planning

Boost:

- 30.6Gy / 17#
- 2x VMAT arcs 6MV

Craniospinal:

- 23.4Gy/ 13#
- 2x Lateral whole brain 6MV IMRT field-in-field beams
- Perspex box on lateral brain fields to treat meninges
- 1x PA 6MV whole spine Photon field (20%)
- 2x PA 18MeV Sup & Inf Spine electron fields with 3x 0.8cm junction gaps (80%)

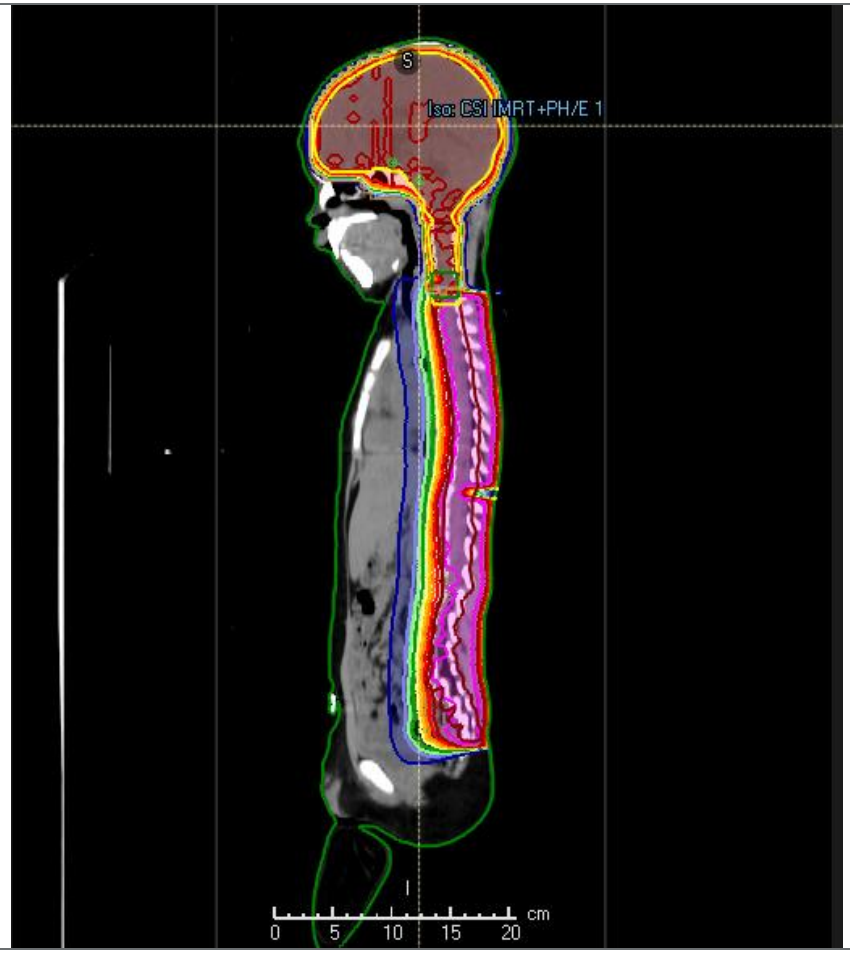

Figure 3: Patient's craniospinal plan

Treatment

- “Dummy run” undertaken
- SGRT ROI drawn
- Boost fractions treated prior to craniospinal
- Right Lateral KV brain image
- PA KV spine image
- Superior and inferior electron template drawn on daily

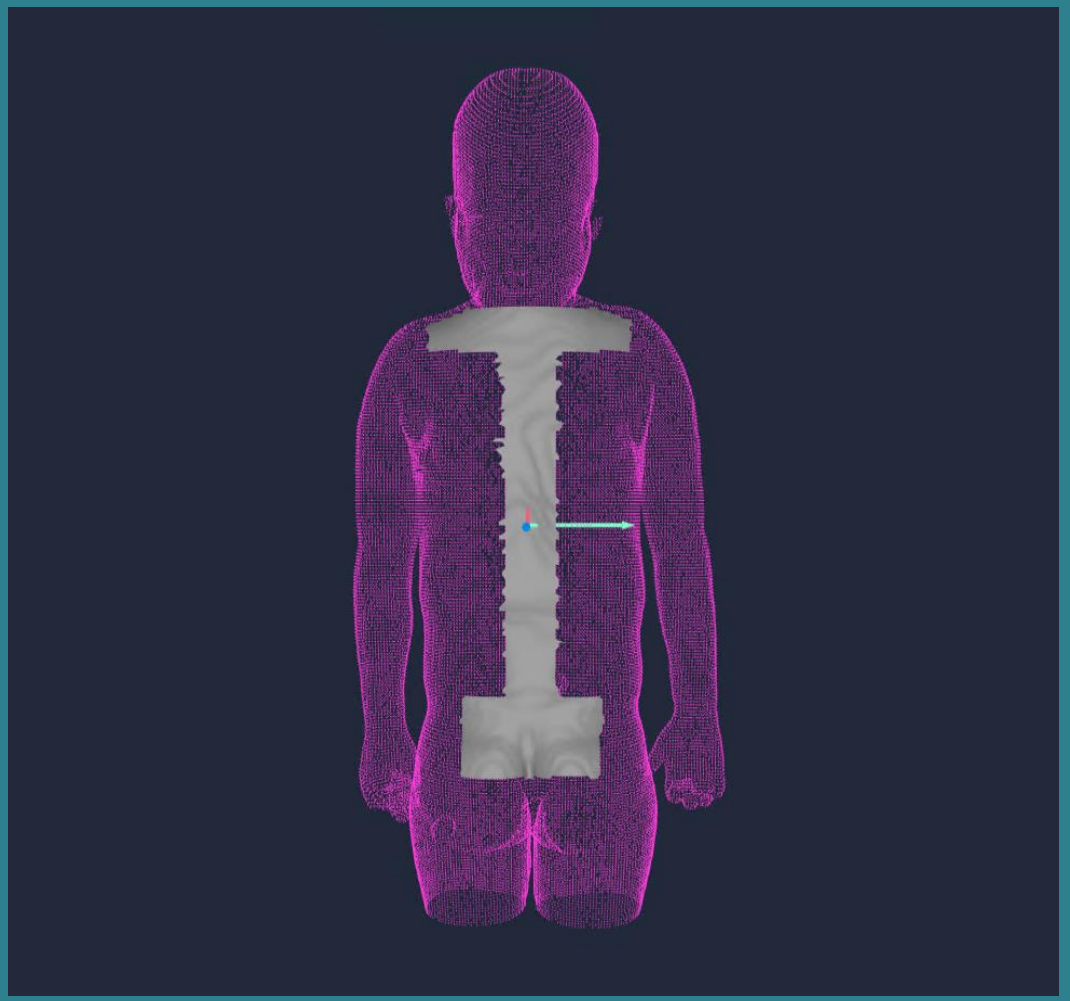

Figure 4: SGRT Region of Interest

Results

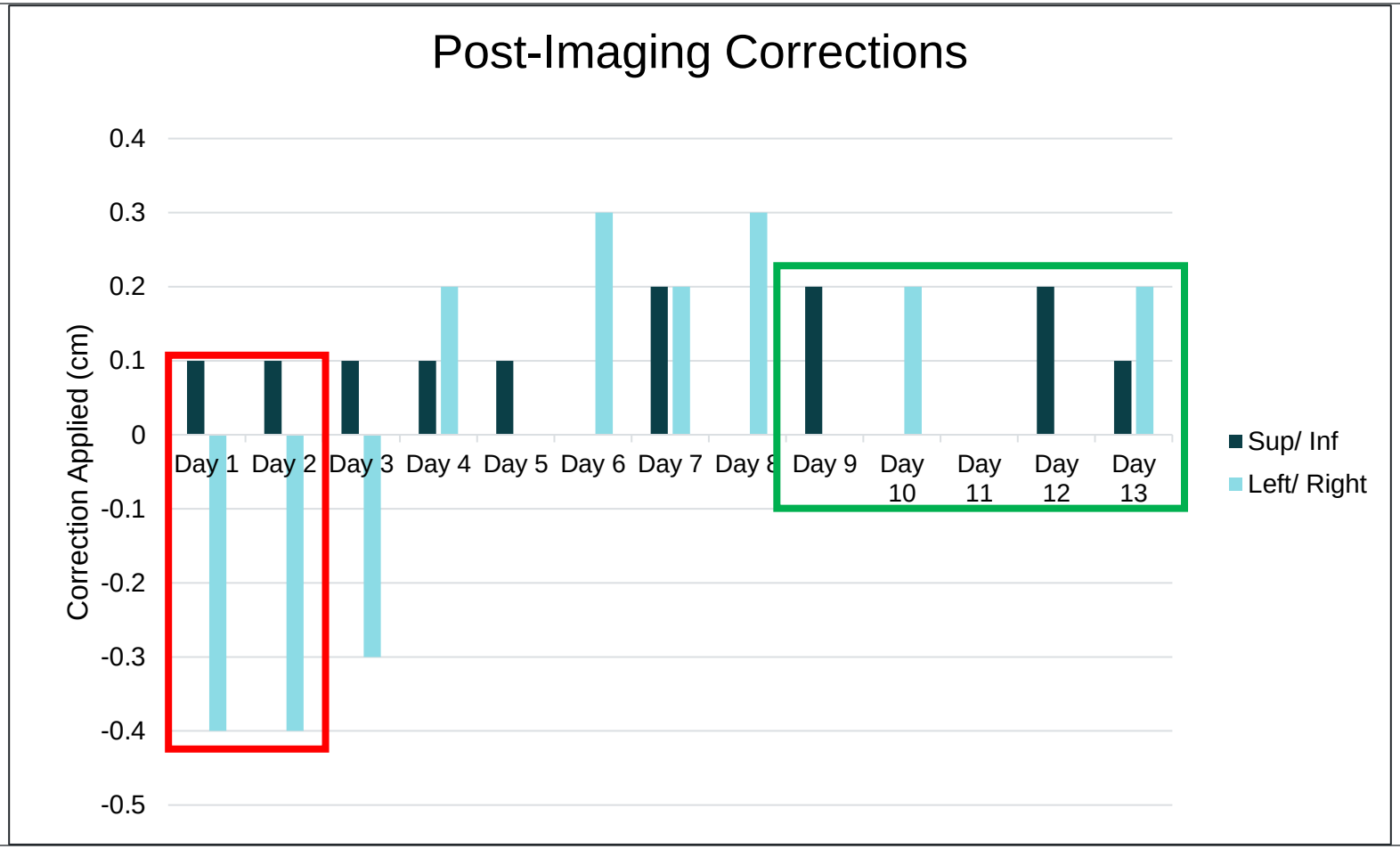

Figure 5: Craniospinal Post-imaging corrections

Results

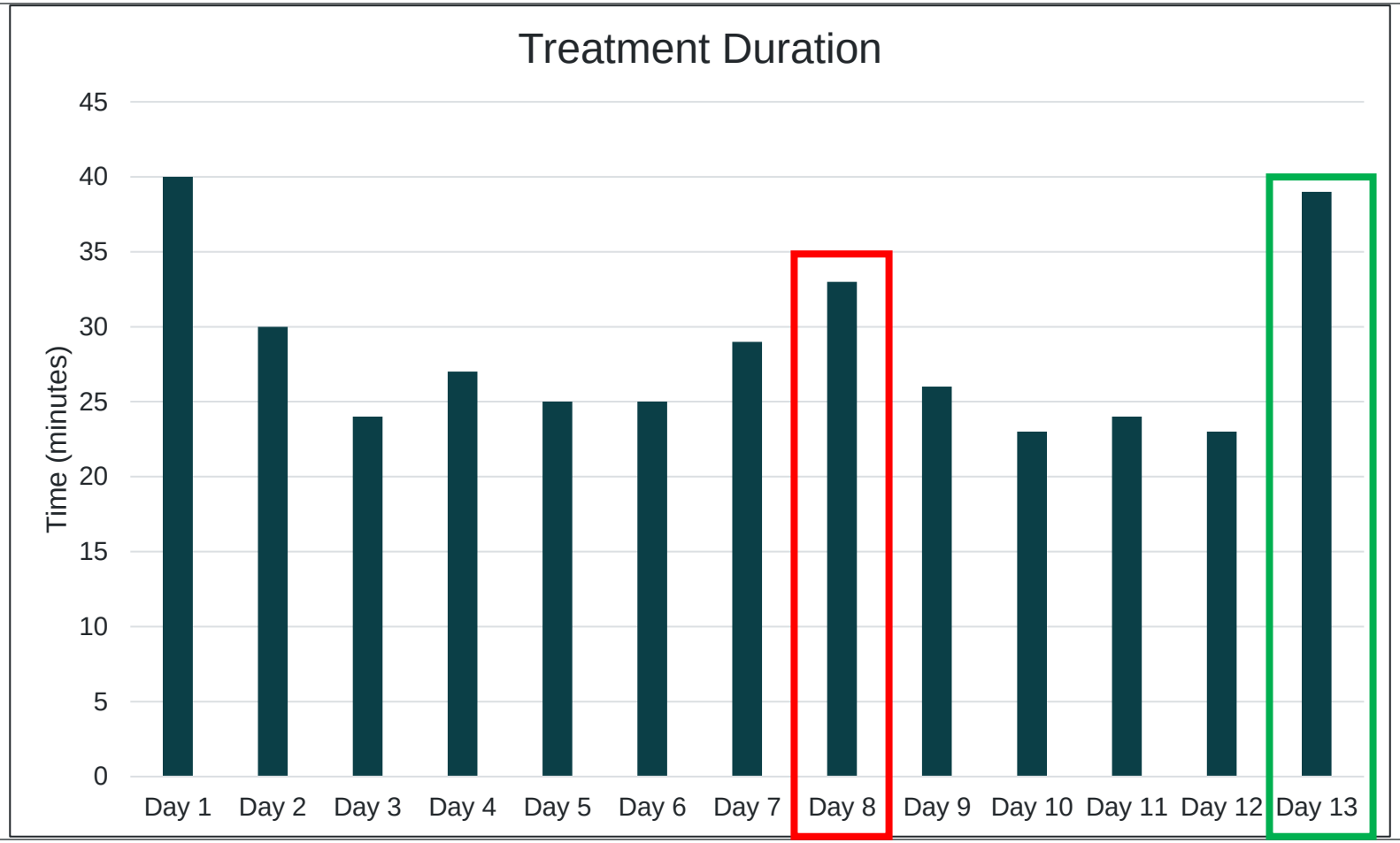

Figure 6: Craniospinal treatment duration

Strengths and Limitations

Strengths:

- Patient not required to undergo GA
- Decreased set-up time
- Patient able to move between treatment beams

Limitations:

- Supporting literature limited
- Unable to use to assist electron setup

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Conclusion

Future Directions

References

1. Figure 1: Medicine, J.H. (2025) *Patient Receiving Radiotherapy*, *Spinal Cancer and Spinal Tumours*. Johns Hopkins. Available at: https://www.hopkinsmedicine.org/health/conditions-and-diseases/spinal-cancer-and-spinal-tumors (Accessed: 2025).
2. Freislederer, P. *et al.* (2020) 'Recent advances in surface guided radiation therapy', *Radiation Oncology*, 15(1). doi:10.1186/s13014-020-01629-w.
3. Seravalli, E. *et al.* (2024) 'Surface guided radiotherapy practice in paediatric oncology: A survey on behalf of the SIOPE Radiation Oncology Working Group', *British Journal of Radiology*, 97(1157), pp. 1044–1049. doi:10.1093/bjr/tqae049.
4. Cumming, J. et al. (2024) 'Surface guided radiation therapy for paediatric patients – a mixed methods analysis', Journal of Medical Radiation Sciences Oral Abstracts

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Questions?