

Theme: **Physics**

PTCOG-AO2025-ABS-0160

Application of an in-house Video Feedback System for Respiratory-gated proton therapy

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Background / Aims:

- An in-house visual feedback device (VCD) was developed for respiratory gated proton therapy of patients at our center.
- To present its clinical implementation and impact on stability and reproducibility of respiratory signals for patients undergoing respiratory gated proton therapy.

Subjects and Methods:

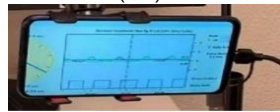
- The Varian ProBeam proton system with an RPM system was used for thoracic patients selected for respiratory gated proton therapy.
- The in-house VCD system is shown as below



(a)



(b)



(c)

Fig 1. A sample patient with the goggle (VR Shinecon) during proton treatment (a). The goggle (VR Shinecon) shows respiratory signal (b), which is screen casted from a smart cell (Honor X9) connected to RPM computer through a DVI-to-Type-C converter cable (c)

- In total 15 patients were treated both w/o VCD at the beginning and w/ VCD later.
- Respiratory signals and treatment time were compared w/ and w/o VCD.

Result:

- The mean gating trigger rate was 92.3% w/ VCD, vs 78.0% w/o VCD.
- Respiratory cycle consistency was better w/ VCD with the mean duration error of 0.15 seconds vs 0.36 w/o VCD.
- Patient-reported acceptance scores averaged 8.3 w/ VCD system compared to 6.7 w/o VCD, suggesting better patient tolerance and experience with VCD training.

Table 1. Comparison of respiratory signal for patients w/o (Left) vs. w/ VCD (Right)

