



Technical report for the upgrade of the visual guidance patient-controlled respiratory gating system for magnetic-resonance image-guided radiation therapy

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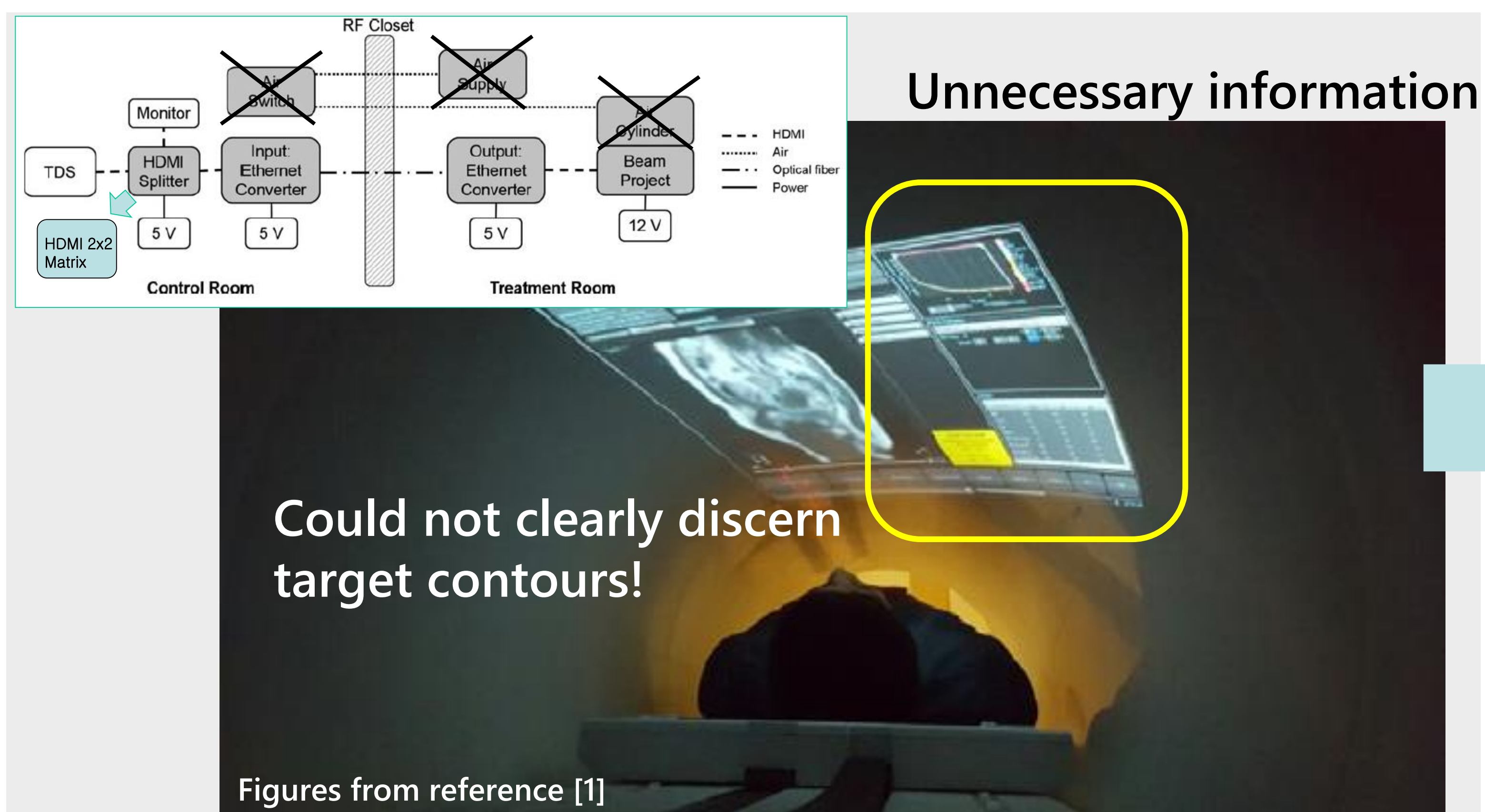
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Objectives

- This study aims to report the technical improvement of the visual guidance patient-controlled (VG-PC) respiratory gating system for magnetic resonance image-guided radiation therapy (MR-IGRT).
- In addition, we also introduces a new web-based respiratory training program based on a commercial real-time respiration measurement device.

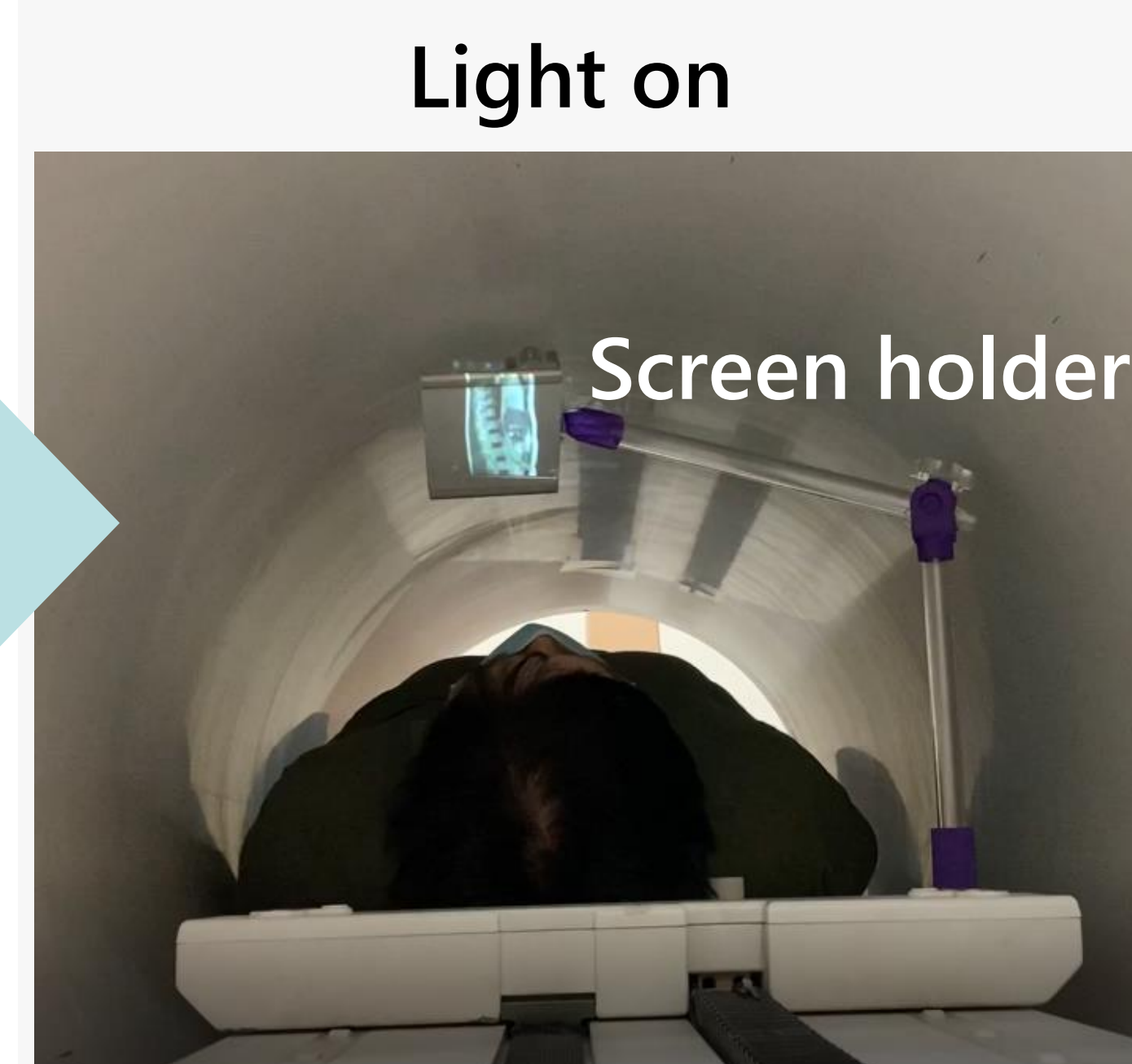
VG-PC Respiration Gating System



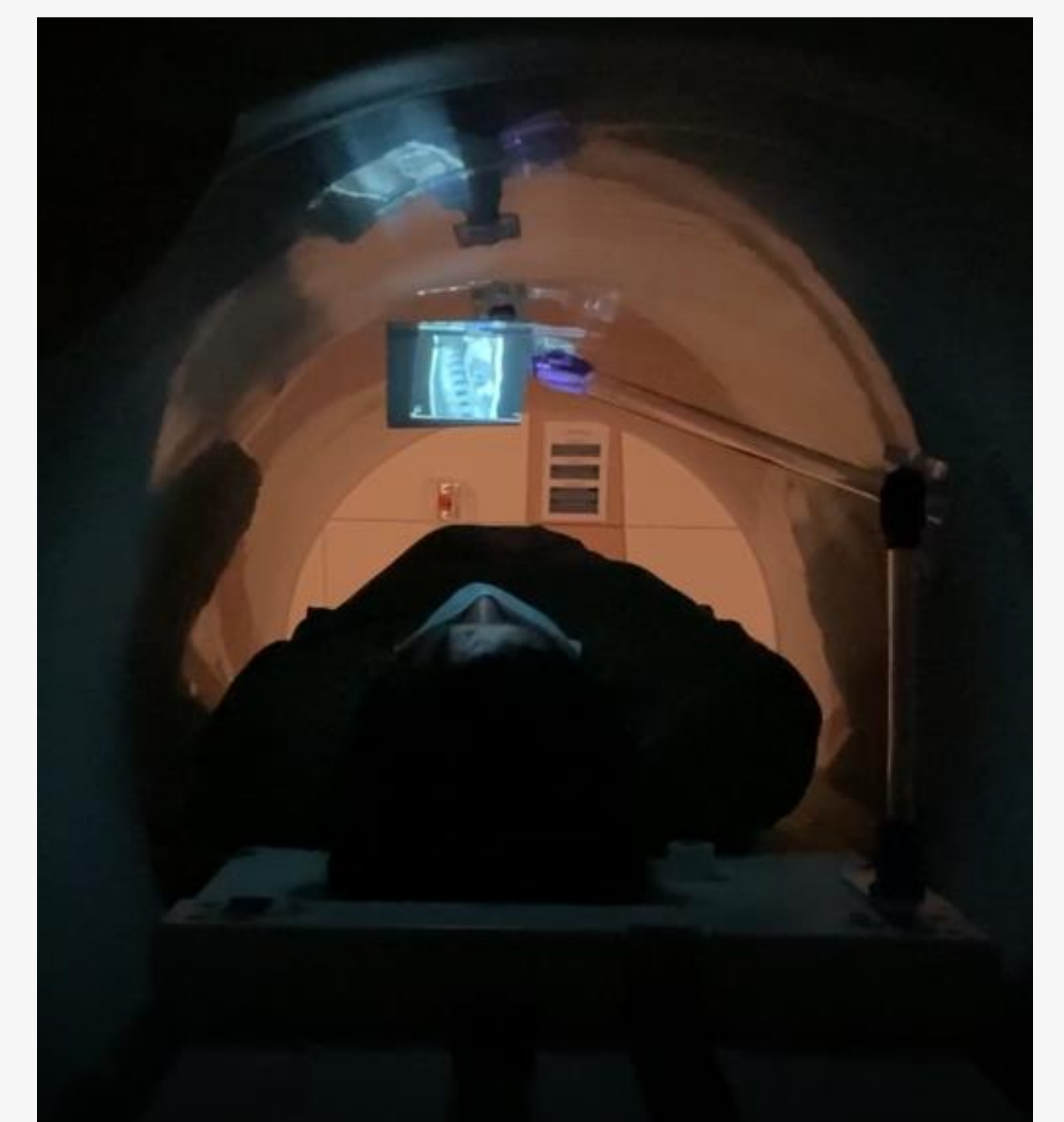
Methods

- The large aspect ratio of the projected MR images on the bore resulted in poor image visibility so that the patients who had blurry vision often have difficult to discern the target contours.
- We designed a screen holder attached to the patient couch to adjust the projection angle between the screen and the projector.
- Furthermore, we developed the web-based respiratory training program based on a commercial respiration measurement device (Go Direct® Respiration Belt, Vernier).

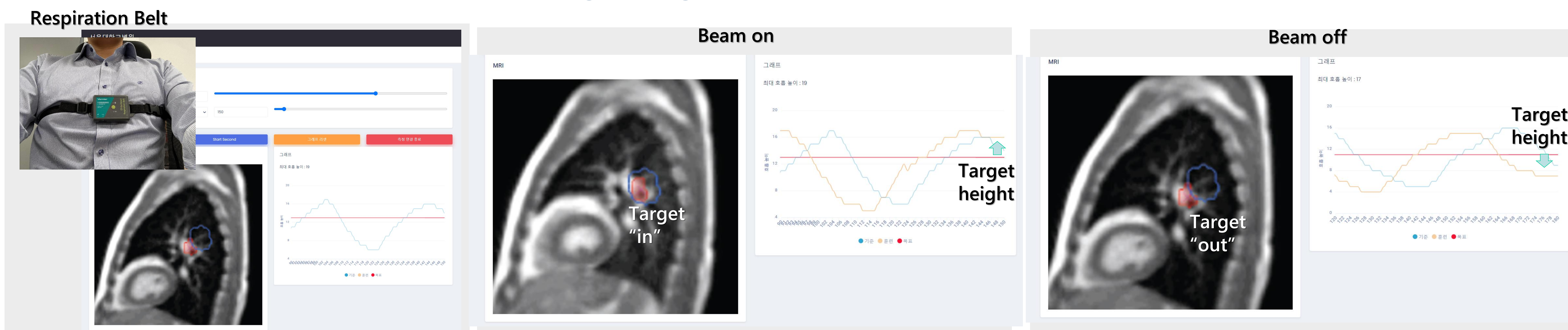
Upgraded!



Moderate light on



Web-based Respiration Training Program



Results

- The target contours were clearly discriminated from the magnified MR images by using the screen holder.
- This technical improvement is expected to be helpful especially for the patients who have blurry vision.
- The training program was able to measure the real-time response from respiratory motion via Bluetooth.
- When the signal height was greater than a prefixed threshold, the MR images of 'beam on' was displayed. The MR images of 'beam off' was displayed when the measured signal was lower than the prefixed threshold.

Acknowledgement

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Conclusions

- The VG-PC respiratory gating system was technically improved in terms of the quality of MR images on the screen.
- The web-based respiration training program was also successfully developed.

Reference

[1] Kim JI, Lee H, Wu HG, et al. Development of patient-controlled respiratory gating system based on visual guidance for magnetic-resonance image-guided radiation therapy. *Med Phys*. 2017;44(9):4838-4846.

Keywords

Visual guidance, patient-controlled, respiratory gating system, magnetic-resonance image-guided radiation therapy