

AbstractID: 8478 Title: Improvement of the stability and reproducibility of Deep-Inspiration Breath Hold for left breast irradiation using video-based visual coaching and 3D surface imaging

Purpose: To assess and quantify the improvement in stability and reproducibility of Deep-Inspiration Breath Hold (DIBH) for left breast irradiation when using video-based visual coaching and 3D surface imaging.

Method and Materials: Ten volunteers were asked to perform a series of four 20-second DIBHs without coaching followed by a series of 4 DIBH with visual coaching. A 3D surface imaging system (Vision RT Ltd, London) was used to track the motion of the breast surface. Visual coaching was performed with the aid of video goggles which displayed the surface-based respiratory signal tracked by the surface imaging system. During the non-coached DIBHs a window level was identified for each volunteer at their DIBH level. When coached, the volunteers were asked to maintain their DIBH respiratory signal within the window level identified before. Reproducibility and stability of DIBH were measured for each volunteer. Reproducibility is defined as the standard deviation of the different DIBH levels. Stability is measured as the average standard deviation of the breathing signals within each individual DIBH.

Results: With visual coaching all the volunteers improved reproducibility of the DIBH with respect to un-coached DIBH, and 9 of the volunteers improved stability of the DIBH. The volunteer that did not improve stability had a very stable DIBH even without coaching. On average, reproducibility improved from $\pm 1.6\text{mm}$ to $\pm 0.3\text{mm}$, while stability improved from $\pm 1.3\text{mm}$ to $\pm 0.6\text{mm}$.

Conclusion: This work indicates that gated radiotherapy of the left-breast cancer will benefit from visual coaching of the patient. Visual coaching greatly improves reproducibility and stability of the DIBH, both properties that need to be guaranteed for an accurate and efficient treatment. A future study will be performed for left-breast cancer patients.

Conflict of Interests: Research sponsored by Vision RT Ltd.