

How accurate could the RayPilot® system detect real time motion of the chest during breast radiotherapy?

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Purpose

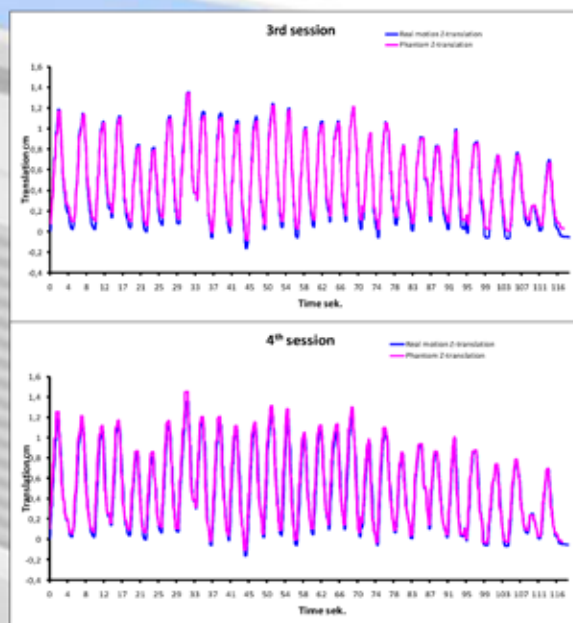
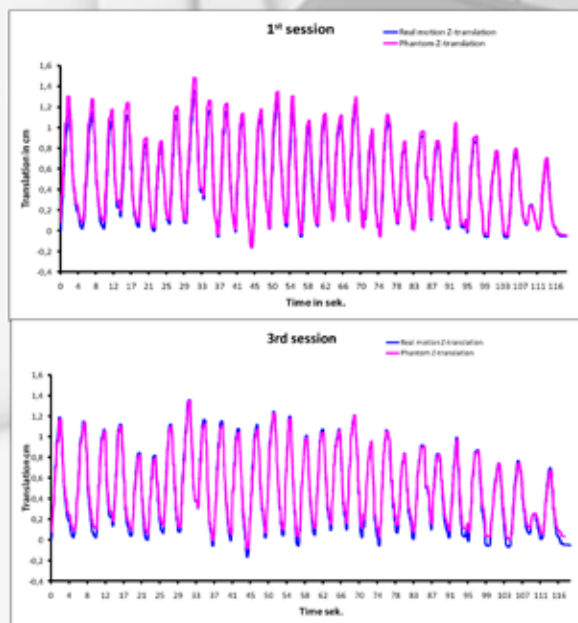
During the course of radiotherapy for left side breast cancer the intrafractional movements, especially breathing motions, could imply a risk of increasing heart dose and the risk for late cardiac toxicity. By increasing the distance between the field edge and the heart by the use of gating, and thereby have control of the movements, it could be possible to reduce that risk. Aims of the study are to evaluate if Micropos RayPilot® system could be used to detect the intrafractional movement in real time (4D) and to evaluate the accuracy of the detected motion.

Materials and methods

Micropos RayPilot® system's position transmitter was placed on the skin near the nipple of the breast for three of the female group members and the system continuous detects the 3D-position of the transmitter during breath. The detected transmitter translation is recorded. The range of translation is measured during normal and deep inspiration. The translation in vertical direction is exported to The QUASAR™ respiratory motion QA phantom. To detect the possibility to track the motion by RayPilot® the position transmitter is placed on the phantom and the detected movements are compared. The detection was repeated four times.

Results

The results show relatively small movements of the chest wall during normal breathing but is relative large in deep inspiration particularly in the vertical direction. The detected movements of the respiratory motion phantom and the movements presented by the RayPilot® system has very good conformity.



Conclusion

The results show that Micropos RayPilot® system is a convenient and precise system to detect and track the chest wall motion during radiotherapy of breast cancer and it could be used in breathing adapted radiotherapy of left side breast cancer.