

AbstractID: 5731 Title: A Fast Scan-Plan-Treat Mode for Topographic Breast Treatment Delivery

Purpose:

To develop a fast scan-plan-treat mode that can deliver breast treatments within 15 minutes

Method and Materials:

With the advent of on-line CT imaging capability, it becomes increasingly feasible to use a radiation therapy system as a single-source device to image, plan, and deliver a patient treatment, in as little as 10-20 minutes from patient entry to exit. Such a mode can be particularly useful for cord compressions and emergency treatments.

This concept is here expanded to deliver breast treatments using tomotherapy, or a radiation therapy treatment delivered with concurrent couch motion but with a fixed gantry angle. MLC modulation may accompany this motion.

The goal of this work was to explore:

- Whether auto-contouring could be used to define breast and sensitive structures.
- Whether this process could be completed in 10-20 minutes
- The adequacy of the plans given the time constraints on both optimization and delivery

Results:

It was determined that auto-contouring could successfully contour the ipsilateral breast, the contralateral breast, each lung, and the trachea in less than 1 minute. Planning could be completed in less than 5 minutes through use of an optimization template, along with less than 5 minutes for imaging, and less than 5 minutes for delivery of 2 topographic angles. The plan optimized in this manner treated the target breast with a homogeneity of $\pm 5\%$, and sensitive structure sparing equivalent to a conventional breast plan. Subsequent fractions can be currently created with this tool, or treated with alternate off-line optimizations.

Conclusion:

The scan-plan-treat paradigm can be combined with a tomotherapy-style delivery to enable breast treatments in less than 20 minutes from the time a patient first enters the clinic.

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