



Method and Device for Planning Treatment with Implanted Radioactive Seeds

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WARF: P03016US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an optimization algorithm for planning the placement of radioactive seeds to treat prostate cancer.

Overview

Prostate cancer is often treated today by implanting tiny sources of radiation, known as seeds, in and around the tumorous tissue, a treatment known as brachytherapy. In order to deliver the prescribed radiation dose to the tumor while sparing healthy tissues and organs, seeds must be placed in a precise pattern. Treatment optimization methods have been developed that first calculate many possible seed patterns and the doses they will deliver, and then select the one that delivers the optimal dose. However, this process is time-consuming even when calculations are made with a high-speed computer.

The Invention

A team of UW-Madison medical physicists has now developed an extremely rapid optimization algorithm for planning the placement of radioactive seeds in prostate tissue. The technique is based on a “greedy” algorithm and an adjoint function for a tissue region-of-interest (ROI). The adjoint function is defined as the sensitivity of the dose in the ROI to the placement of a single seed at any arbitrary position. For each seed position, a ratio is computed that is the sum of the adjoint values for sensitive structures (e.g., urethra) divided by the adjoint value for the target tumor in the ROI. An optimization process then follows in which the greedy algorithm inspects the ratios and ranks the seed positions based on their ability to irradiate the tumor while sparing sensitive tissue. The greedy algorithm then designs the overall seed pattern by choosing the most favorable seed positions.

Applications

- Prostate cancer treatment

Key Benefits

- Relevant to any radiotherapy treatment planning systems that performs planning for brachytherapy
- Achieves the same quality of brachytherapy plan as existing methods, but at up to 1500 times the speed
- Could allow dynamic, real-time optimization after the placement of each seed

Additional Information

For More Information About the Inventors

- [Douglass Henderson](#)

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- [See WARF reference number P03190US for information on a new device for placing brachytherapy seeds that is designed for use with the “greedy” algorithm treatment planning method.](#)

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Tech Fields

- [Radiation Therapy : Other radiation therapy technologies](#)
- [Radiation Therapy : Treatment planning](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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