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Objective comparison of RAPID strand and free selectSeeds loading for permanent prostate implants using an inverse planning approach

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Purpose: To quantify differences in treatment plans of permanent implants between RAPID strandTM and free selectSeedTM loading patterns.

Method and Materials: The 3-D US scan and treatment plan from ten patients who have been treated for prostate cancer with the permanent seed implant technique were arbitrary selected. The plans were generated manually by an experienced dosimetrist backed up by a team. Essentially the RAPID strandTM seed-loading pattern was used. Retrospectively the patients were re-planned with a commercial 3-D planning system (SPOT-PROTM 3.0) using the new inverse planning algorithm (IPSA). A plan with a RAPID strand loading pattern (IPSA-R) was generated and a plan with a free seed-loading pattern (IPSA-F).

Results: The calculation time of IPSA was < 15 s for 400.000 iterations (2.5 GHz PC), which is fast enough to be used intra-operatively. The target coverage V_{100} was equal (98–99%) for all plans. The target and urethra DVHs of the manual and the IPSA-R plan were similar. By contrast the urethra doses D_{30} , D_{30} , D_{20} , D_{10} , and D_{max} of the free seed plan IPSA-F were 27–41 Gy lower than in the RAPID strand plan IPSA-R.

Conclusions: When using free seeds instead of RAPID strands, the urethra dose is significantly reduced.

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