AbstractID: 1400 Title: Controlling dose falloff in IMRT treatment planning: the "anchor zone" method

In IMRT treatment planning, achieving a good dose falloff on all sides of the target volume may be difficult. We are developing a simple technique of controlling dose characteristics near the edge of a target volume which still allows for fast optimization. We introduce an 'anchor' structure, which is a strip region which surrounds the target at a fixed margin. The anchor zone has a finite width (typically 1-2 cm). Between the anchor zone and the target lies the ‘transition zone’, also typically 1 to 2 cm in width. The anchor zone is included in the objective function as a structure which should receive low doses. It thereby serves to control the dose falloff behavior outside and near the target. As an example, we tested a head and neck IMRT plan example with five 18 MV beams and 1147 beamlets. An efficient commercial interior point QP optimization algorithm was used. The typical optimization time was 3 sec on a 2.6 GHz PIII computer. The resulting target dose volume histogram characteristics depend on the size of the transition zone: larger transition zones may yield better target coverage and more uniform dose inside the target, and require less beam modulation. The ‘anchor zone’ technique, which might be applied within other IMRT treatment planning systems, may provide improved control over target dose properties while still allowing for very fast optimization methods.

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