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## Improvement of a Planning Technique Based on Heuristic Target Shaping

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In stereotactic radiosurgery (SRS), finding a specific condition that includes the target in the prescription dose while sparing the critical organ is tedious, because there are many combinations of positions and collimator sizes for each isocenter. To automatically plan the SRS, a new planning method based on heuristic target shaping was developed in a previous study. 1) The dose distribution of one isocenter was modelled as a sphere. 2) The target was constructed by piling up cylinders along a virtual axis, which was the longest line in a given target. 3) Spheres were then packed in each cylinder according to the position and diameter of each cylinder in order to cover each target divided by the height of the cylinder. The results from the application of the previous method to three imaginary targets were found to be satisfactory in terms of target coverage, result reproducibility, and calculation time. The number of isocenters, however, was impractical. In the present study, a new step was added between steps 2) and 3) for reducing the number of isocenters. According to the diameter and position of each cylinder, each cylinder was combined with adjacent ones. As the cylinders were further combined, the height of each cylinder was increased, which resulted in a practical number of isocenters. The results of applying imaginary targets were satisfactory in terms of the number of isocenters, which was reduced by more than 25% with the new method for an identical target.

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