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An iterative optimization algorithm for three dimensional intensity modulated proton dose plan is under development. The goal of this optimization is to deliver the prescribed dose to the target by a dynamic spot scanning technique using small pencil beams. Treatments are to be given by a stepped sequence of accelerated beam energies. Each energy step treats a layer of the target by magnetically deflecting a small scanning beam over a matrix of aiming points. The scanning beam is held stationary at each aiming point until a pre-specified dose for that point is delivered. Dose distributions are computed by superposition of narrow pencil beams ranging in energy from 70 - 250 MeV. Pencil beam dose kernels are computed by Monte Carlo simulations have been confirmed by physical measurement. The optimization is accomplished mainly in two stages. First, a method called "sequential field optimization" is used to optimize the layer intervals, number of aiming points, and initial intensity of each pencil beam along each single field direction. Then we do "multiply field optimization" based on dose volume constraints of targets and normal tissues which optimize pencil beams of all fields simultaneously. The multiply field optimization also includes the optimizing of important factors of target and normal tissues. The important factors help the multiply field optimization satisfy the constraints of target and normal tissues. Early clinical treatment planning comparisons indicate that the intensity optimized spot scanning technique can produce superior dose distributions compared with those produce by passive proton beams.