

Post implant evaluation of permanent prostate implants typically requires the identification of 30 to 80 seeds. Matching these seeds on orthogonal or stereo-shift radiographs and entering them in proper order into the treatment planning system is time consuming, often requiring over two hours. We have implemented an automatic seed matching algorithm for clinical use. Three radiographs are needed - an AP, a shifted AP, and an oblique or lateral view. These images are digitized with a Lumisys film microdensitometer and electronically transferred to a VAX workstation. The user establishes film orientation and magnification by identifying the simulator isocenter (crosshair) and one additional point (superior/right or superior/anterior) on each image with the mouse. Image magnification and contrast enhancement improve seed visibility. The user selects all seeds seen in each radiograph without regard to order. Seed matching and 3D triangulation are performed by the algorithm. Errors in film shift or seed identification are indicated by a large value of the final cost function. Dose calculations based on the seed coordinates are performed, treating the seeds as point sources with the Pd-103 parameters of TG-43. Isodose distributions in transverse, coronal and sagittal planes can be plotted and dose-volume statistics are printed. Relative seed coordinates agree within 3 mm with those found using manual seed matching with stereo-shift films on a commercial treatment planning system. The time to perform a 50 seed post-implant evaluation is reduced by a factor of three (or five minutes following seed image entry).