

A Theratron T-1000 cobalt treatment unit was equipped with a Theraview epid. Field edges in the portal images are extremely blurred because of the size of the cobalt source. Automatic verification of the treatment field outline cannot be performed with the edge detection techniques employed for images acquired with a linac. Deblurring of the patient anatomy is possible by iterative deconvolution with a spatially invariant PSF when the detector is positioned relatively close to the patient during image acquisition.

The blurring effect is both very pronounced and spatially variant in the projection of collimator jaws and blocks. Deblurring of images with a spatially invariant iterative constrained deconvolution algorithm introduces disturbing artifacts when the local PSF does not correspond to the actual PSF. Spatially variant deconvolution is practically impossible because of a 300-400 times longer computation time. Therefore we introduced a new technique for evaluation of field edges in cobalt portal images. A reference portal edge geometry is computed from the prescribed beam geometry, by using ray tracing to modulate the computed outline. The differences in intensity between this reference image and the one obtained from the cobalt epid, are analyzed. Action levels to detect field shape errors were determined experimentally, incorporating the local attenuation by the patient.