The clinical usability of an image-based pre-treatment patient alignment system (BAT™) was determined. The specific application was external-beam prostate treatments and these studies were done post-treatment. Patients were aligned and treated in the traditional fashion using LASERS, field lights and skin marks. Subsequent to treatment, the image-based alignment system was used and any discrepancies from the traditional alignment noted.

The positioning system is presently tightly integrated with a planning system (Corvus™) and a transabdominal ultrasound probe attached to a position/orientation sensor. a physician contours the prostate on CT images and a plan is developed. The contour and dose-distribution data are transfered to the positioning system. In use, the positioning system is registered to the treatment machine with a mechanical jig and an technologist then uses the ultrasound probe to obtain axial and sagittal images of the prostate. Planning system derived contours and dose distributions are overlaid on the prostate images. The operator can move the contour/dose-distributions until they properly overlay the target. The positioning system then reports the couch shifts. Once the couch has been moved, confirming images are obtained.

Initial data includes images for 5 prostate cancer patients for 16 consecutive treatments. The average set-up time was 10 minutes. The couch position shifts were mostly within 1cm. Only 3 of 48 shifts (6.0%) exceeded 1cm. The average observed shifts were as follows: lateral 1.4mm, caudad/cephalad 5.6mm, AP/PA 0.7mm.

We are acquiring more clinical data as we prepare to apply the system for conformal radiotherapy of prostate cancers.