

AbstractID: 7366 Title: Quantification of pitch angle deviations in patients receiving IMRT for prostate cancer, without the use of fiducial seed markers

**Purpose:** To demonstrate the strength of kV cone beam CT (CBCT) over MV portal imaging in the detection and quantification of pitch errors in prostate patients without use of internal fiducial markers. Additionally the cause and subsequent correction of large pitch variations was investigated as the daily use of CBCT had highlighted a small number of patients with deviations in set-up of more than three degrees.

**Method and Materials:** By using CBCT six variables can be corrected – three translations in the orthogonal axes as well as pitch, yaw, and roll. Five patients and RANDO phantom were studied, with significant differences being seen in pitch angle for two patients in the same direction as couch sag. Slight alterations were made in the position of the patients' knees and ankles in an attempt to reduce the pitch deviations. For all patients right lateral MV portal images and corresponding digitally reconstructed radiographs (DRR) were shown to the attending physician and a senior therapist with the question to determine if pitch greater than 3 degrees could be determined.

**Results:** The deviation needed to create a pitch angle of 5 degrees in the RANDO phantom is significant so couch sag does not explain the deviations seen in a small population of the prostate patients imaged with CBCT. MV images were judged as showing insufficient information to determine pitch and

**Conclusion:** Our clinical practice is that when any angular deviation over 3 degrees is observed in a patient set-up the attending physician is called to decide how to proceed – treat or set-up again. The phantom work demonstrated that a pitch variation in a patient set-up cannot be attributed to couch sag and patient studies show that a few centimeters difference in knee separation lead to up to 3 degrees increase in pitch angle