

Purpose: When patients are held in a mask for co-planar intracranial IMRT the question remains as to how much the patient shifts during the 10-20 minute treatment. This study was undertaken to obtain data using cone beam CT (CBCT) measurements and determine the range of this intra-fraction motion. It was also unknown what effect the couch movement, which included tilts up to 3 degrees, would have on the stability of the patient positioning. **Method and Materials:** Intracranial patients being treated on a new Synergy Linac with 4 mm MMLC, CBCT and a Hexapod couch (Elekta Inc) were immobilized at CT planning and during treatment using a Uniframe mask and “Bear Claw ” shoulder restraint (WFR Aquaplast) . A CBCT scan was taken once the patient was set-up to marks on the mask (Initial Scan), after Hexapod adjustment (Pre-Treatment) and immediately after treatment (Post-Treatment Scan). CBCT to the planning CT fusion was accomplished with the system software package and semi-automatically determines the three translations and three rotations which are required. The Hexapod couch was used to adjust positioning only at the Initial Scan. **Results:** Based upon 64 set-ups analyzed: after Hexapod adjustment 53% of Pre-Treatment CBCTs indicated that the anatomic isocentre was within 0.5 mm of the plan; 38% were within 0.5 mm of the plan according to the Post-Treatment scan. The median 3D vector shift from Pre- to Post- treatment was 0.35 mm, its average 0.55 mm, and its standard deviation 0.56 mm. (Note, however, that the CBCT isocentre is not perfectly coincident (< 1 mm) with the therapy beam isocentre). **Conclusion:** The average intra-fraction motion of this patient cohort was observed to be sub-millimeter.