

AbstractID: 4767 Title: Evaluation of a Prototype Thermoplastic Mask Using the Novalis Body system.

**Purpose:** To measure interfraction setup uncertainty of patients undergoing IMRT treatment who are immobilized by a prototype reinforced thermoplastic mask.

**Methods and Materials:** Two mask designs are utilized depending on the anatomical location of the lesion. To validate patient setup before each treatment fraction, the Novalis Body/ExacTrac system is used. That system uses optically imaged infrared (IR) retroreflectors as well as kilovoltage x-ray imaging to verify patient setup. Patients were immobilized with the Orfit HP IMRT immobilization system, and IR markers were placed anteriorly on the prototype mask. Patients were scanned with a Philips ACQsim CT, and the image set was transferred to BrainScan TPS where the IR markers are identified and a plan is created. The plan is then transferred to ExacTrac. The patient is initially setup using the IR markers. Two kV x-rays images are taken and fused to the corresponding DRRs generated from the reference dataset used for planning. The patient is moved into position and treated based on the shifts generated from the fusion transformation. The ongoing study currently has seven patients with a total of 99 treatment fractions.

**Results:** The average x-ray shift and maximum deviation for each patient will be profiled. The current results show an average vertical, longitudinal, and lateral magnitude of 0.98 mm, 0.96 mm, and 1.02 mm, respectively with a standard deviation of 0.49 mm, 0.65 mm, and 0.64 mm. The maximum observed shift was 4.92 mm and is accredited to a cephalad lesion where there was poor image contrast which affected the fusion quality.

**Conclusion:** This system adequately immobilizes the patient and constrains interfraction setup uncertainty to within two millimeters for most patients. At our institution, this immobilization system is used to treat lesions proximal to critical structures.

**Conflict of Interest:** The masks were provided by Orfit Industries, Belgium.