

## AbstractID: 13700 Title: A Method for Dose Calculation and Collision Detection in Gamma Plan Pre-Planning Mode

**Purpose:** The latest version of the Gamma Plan treatment planning system allows for treatment “pre-planning” using an image set with no headframe. However, in pre-planning mode the user is not able to define the Gamma Knife coordinate system, so collision checks and dose time calculations cannot be performed. This restriction is particularly limiting when pre-planning head and neck cases or cases for lesions located in the posterior fossa. We have developed a simple method to establish the Gamma Knife coordinate system and to therefore run collision checks and dose time calculations.

**Method and Materials:** An image set of the Gamma Knife headframe and fiducial box is imported into Gamma Plan and opened in treatment mode. An MR or CT patient image set without a headframe is imported into the same treatment planning window. The two image sets are then co-registered and fused. The resulting composite images may then be used to plan a treatment with the full Gamma Plan functionality, including collision monitoring and dose time calculations.

**Results:** The headframe image set was successfully co-registered and fused to patient image sets and used for treatment planning. The fused image set was then able to be checked for collisions and dose delivery times were able to be calculated.

**Conclusion:** We have developed a simple method that allows for the Gamma Knife coordinate system to be established in Gamma Plan pre-planning mode. This technique lets the user check for collisions and calculate dose times prior to headframe placement. It also may serve as an aid for determination of headframe placement on treatment day. The main limitation of this method is that it does not allow for gamma angles not equal to 90. **Supported in part by NCI T-32 CA113267.**