

## The Comparison of Peripheral Dose In Stereotactic Brain Irradiation With The Use of Different Treatment Techniques

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## Abstract

**Objectives:** Brain stereotactic radiosurgery involves the use of precisely directed, single session radiation to create a desired radiobiologic response within the brain target with acceptable minimal effects on surrounding tissues. In this study, the comparison of peripheral dose (PD) was made for Truebeam STx and CyberKnife M6 treatment plans. For Truebeam STx, treatment planning was done using VMAT technique with 6 FFF beam in Vertex, Nasal Cavity, and Posterior fossa regions.

**Methods:** Head of CIRS phantom was used in this study. A full helical CT scan of the head was performed. In all cases to account set-up errors, the 0.1cm margin was added to create PTV for simulating the real patient situation. Brain part of Phantom was divided into three section in this study called Vertex (V), Nasal Cavity(NC) and Posterior Fossa(PF) regions. In every region, 4PTV was contoured in Eclipse and Multiplan Treatment Planning System with the diameter of 3cm, 2cm, 1cm, 0.6cm. 5 Gy dose was prescribed for all tumors. In this study, Peripheral Dose calculated by two different TPS were compared with EBT3. In each planning system, 0.01cc dummy volumes were created both left and right side in axial slices. Calculated and measured differences were reported for various platforms and algorithms.

**Results:** We calculate same treatment plans with both AAA and AXB for different tumor size and location in the brain. Both algorithms were in good agreement in V and PF locations which has homogeneous media inside the tumor. However, dose differences were quite large in NC location which has air cavity inside the tumor. The same comparison was done for RT and MC calculation algorithm in MultiPlan. Large differences were observed between two algorithms.

**Conclusions:** In this study, we have represented that the changes in treatment technique and used various algorithm may cause large differences in PD.

### Open Access

#### Abstract

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