

AbstractID: 1625 Title: Dosimetric evaluation of a modified array of 5 mm circular pencil beams for serial tomotherapy

Oblique couch angle serial tomotherapy has been utilized at our institution since 1998 for the stereotactic radiosurgical treatment of small intracranial lesions¹. In 1998, we co-developed with the vendor a distally located post collimation device (Beak) which reduced the Mimic's smallest deliverable pencil beam size from 8.5 mm x 10 mm to 4 mm x 10 mm. The reduced pencil beam size has been shown to significantly improve conformality for small irregular lesions². In this work we present a new post collimation device (called **Gizz**), capable of redefining the smallest deliverable pencil beam size to an array of circular, 5 mm diameter beams at isocenter. Much like the Beak, the device is also fitted into the mouth of the Mimic but, unlike the Beak, redefines the pencil beam in both dimensions. The prototype device is manufactured from a cerrobend block possessing 40 dual divergent precision-drilled holes which are each aligned to the center of a corresponding Mimic binary multileaf collimator (mlc) vane. Thus, by opening and closing individual Mimic vanes, individual circular pencil beams may be modulated in intensity. We present dosimetric data demonstrating the superiority of the reduced pencil beam size for the treatment of small, irregularly shaped intracranial targets such as arteriovenous malformation and acoustic neuroma.

¹Salter et. al. Med Phys 28(12), (2001). ²Salter Med Dosim 26(1), (2002)

Dr. Salter holds patents and receives royalties related to Nomos' *AutoCrane* device.