

## THE MEASUREMENT OF VIRTUAL WEDGE FOR SIEMENS PRIMUS LINEAR ACCELERATOR — WEDGE ANGLE & BEAM PROFILE

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***Purpose:*** The virtual wedge which is equipped in Primus uses dose rate variation and collimator jaw motion to simulate the isodose distribution of hard wedge. The purpose of this report are to compare the differences between virtual wedge and hard wedge for desired wedge angles and beam profiles, and to evaluate the feasibility of virtual wedge clinical application.

***Materials and Methods:*** The Memorial 1.0 c.c. parallel plate chamber was used to measure the ratio of MU / dose, to verify the clinic dosimetry sets of virtual wedge. The WELLHOFER WP700 water phantom system with ion chamber was applied to measure the desired angle ( $\alpha$ ) of VW. The beam profile data was measured by the Sun Nuclear The Profiler linear array of solid-state detectors.

***Results:*** Compared with the 4 commonly-used wedge angles, namely, 15°, 30°, 45° and 60°, the deviation of desired virtual wedge angle for 6 MV and 18 MV photon beam are all within one-and-half degree. For beam profiles, the maximum deviation between VW and HW for 6 MV was 5.0% with wedge angle of 60°, depth of 5 cm, and field size of 15 × 15 cm<sup>2</sup>. For depth beyond 5 cm the maximum deviation between virtual wedge and hard wedge for 18 MV was 5.7% with wedge angle of 60°, depth of 10 cm, and field size of 20 × 20 cm<sup>2</sup>. However, for depth less than 5 cm, the maximum deviation for 18 MV will be as high as 11.1%.

***Conclusions:*** Due to the different concept and the clinical application of virtual wedge, we need a comprehensive verification data before we apply the virtual wedge technique in the clinics. We also need to set up and practice a quality assurance program for virtual wedge system to assure the treatment quality. [Therapeut Radiol Oncol 1999; 6: 203 - 214 ]

Key words: Virtual wedge, Desired wedge angle, Beam profile