

AbstractID: 12619 Title: Cyberknife Quality Assurance Using a Diode Array

Purpose: To investigate whether the use of a linear diode array is feasible in the measurement of flatness and symmetry of a Cyberknife unit for quality assurance purposes.

Method and Materials: A Mapcheck (SunNuclear) device with a 7 cm solid water phantom (The Phantom Company) was placed at 80 cm SSD from a G4 Cyberknife unit (Accuray). Profile measurements were obtained for field sizes varying from 40 mm to 60 mm. The SSD was then increased to 150 cm, and to 240 cm, and the process repeated. A spreadsheet was written to calculate the symmetry and centricity of the profile using the Cyberknife. The same profiles were obtained using Gafchromic EBT film (ISPCorp), and the field flatness and symmetry were calculated using FilmQA (3Cognition).

Results: EBT Film and Mapcheck results agree within 1% for symmetry. An increased SSD to the Mapcheck (and hence an increase in measurement points) did not demonstrate a significant improvement in the accuracy of the symmetry measurement, nor in an increased accuracy in the measurement of the centricity of the laser.

Conclusion: The use of a linear diode array device for quality assurance of a Cyberknife unit has been shown to provide an accurate and time-efficient way to measure both the symmetry of the Cyberknife profile and the centricity of the laser. We hence have adopted the use of the Mapcheck device for our monthly quality assurance of our Cyberknife unit.

Conflict of Interest (only if applicable):