A single diode detector for in vivo dosimetry of photon beams

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Diode *in vivo* dosimetry has been recommended to improve the quality of patient care in radiation therapy. We have characterized the response of the Sun Nuclear QED diode detectors with respect to SSD, field size, wedge, temperature, and detector-beam orientation. Photons beam with energies of 4, 6, 10 and 18 MV were used. The measurements were normalized to the ionization chamber reading at dmax. Our empirical response curves show that the total variation of the diode response to all these factors are within ±4%. This response seems to be less dependent on the SSD, field size and wedge than the Isorad Nuclear Associates diode detectors used by Meiler and Podgorsak (1997) which showed a variation in response larger than 15%.

Usually, each diode is calibrated for a specific nominal beam energy and used clinically with that energy only. We have tested our diodes and have concluded that the high energy diodes (18MV) can be used for all photon energies. We are proposing therefore that only diodes with high energy buildup (18MV) need to be bought for any photon energy. All response curves are still within the range of ±4%.

Using the high energy buildup diode will have the added benefit of amplifying the response of the diode when the wrong energy is used in the patient treatment.