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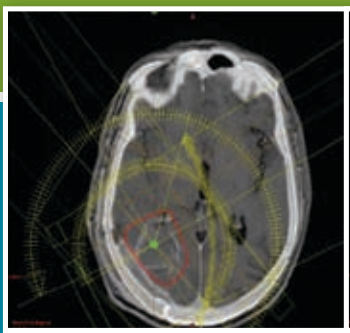
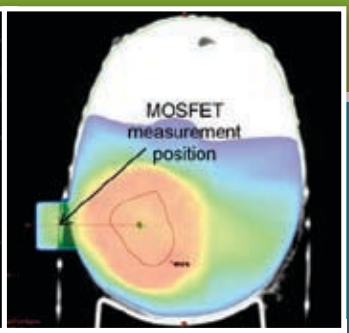
MOSFET Dose Verification for VMAT Treatment

DOSE RATE INDEPENDENT

Dose rate independence for variable dose rate linacs and techniques such as VMAT; in opposition to dose rate dependent detectors (diodes) with limitations when dealing with complex treatments (hypofractionation).



A patient in an immobilization mark is treated with 3 arcs.



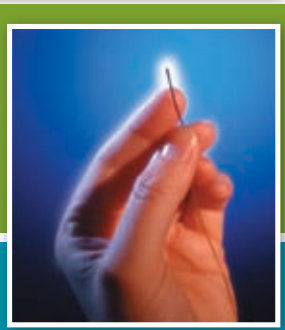
MOSFET placed along with mini-bolus. Three MOSFET detectors used as VMAT beam is non-uniform.

REAL-TIME READ OUT

Convenience of real-time readout after each beam or at end of treatment, allowing immediate action and correction, as opposed to differed readings using OSL detectors (nanoDot) with no possible action during the treatment. Benefit of dose measurement simultaneously on skin and at Dmax, thanks to build-up cap placement flexibility and inherent thin build-up of MOSFETs.

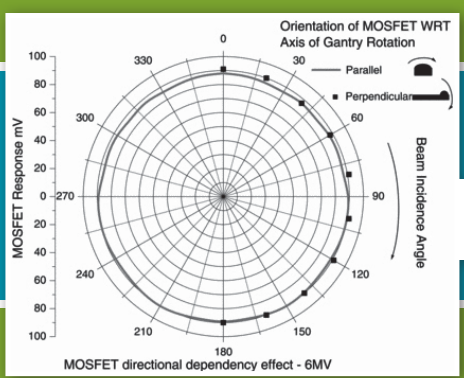
SMALL FOOTPRINT

Small sensors and system make it easy to use in a clinical setting. In-vivo dosimetry possible with small and flexible sensors — Active region of dosimeter measuring only 0.2 x 0.2 mm.



ANGULAR INDEPENDENCE

MOSFET system is isotropic and able to capture dose rate with ±2% for 360-degrees of continuous gantry rotation at various speeds.



Response of MOSFET at various angles.

GOOD SPATIAL RESOLUTION

Point dose measurement and good spatial resolution useful for small beams or beam edges characterization (nanoDot and diodes are less resolved). Using MOSFETs gives added confidence of correct radiation during treatment delivery.

Sources – VMAT In-Vivo Dose Delivery Verification, R Berg, J Gefter, F Kimsey, L Kirby-Harris, R Phillips, J McKay, Erlanger Health Systems, Chattanooga, TN / Sadeghi, A. et al. Texas Cancer Clinic, San Antonio, TX, USA. 2007. / Ramaseshan R, Kohli KS, Zhang TJ, Lam T, Norlinger B, Hallil A, et al. Performance characteristics of a microMOSFET as an in vivo dosimeter in radiation therapy. Phys Med Biol. 2004;49:4031–48. / Best Medical Canada

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