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## The radiation treatment of ocular melanoma: Techniques and advances

**Georges F. Hatoum**

JFK Comprehensive Cancer Institute, USA

**Statement of the Problem:** Ocular melanoma is a rare subset of melanoma, yet comprises the majority of ocular malignancies. Management of ocular melanoma consists of either enucleation or glob-preserving therapies including radiation therapy (RT) and surgical resection. There are generally two categories RT for ocular melanoma, radioactive plaque brachytherapy and external beam radiotherapy (EBRT), including charged particle radiation and photon stereotactic radiosurgery (SRS). In this presentation we give an overview of the technical details and clinical efficacies of different RT techniques for ocular melanoma. In an effort to reduce the invasiveness without compromising accuracy, we developed a novel approach of real-time tracking to ocular tumors that can be applied to high-precision RT either with charged particle or photon beams.

**Methodology & Theoretical Orientation:** A novel “pupil tracking” approach uses a derived 2D/3D transformation to relate the pupil’s 2D coordinate captured by a video camera in the image plane with the tumor’s 3D location in the CT space. A motion phantom was developed to test the feasibility of this technology with a robotic radiosurgery system.

**Findings:** The results show that the unique 2D/3D transformation algorithm is not only theoretically possible but also consistently reproducible with sub-millimeter accuracy.

**Conclusion & Significance:** Charged particle RT or SRS can eliminate invasiveness of brachytherapy. Pupil-based tracking can further assure the physical accuracy and achieve optimal clinical outcomes.

**Figure:** Experimental setup of eye-tracking system.

### Biography:

Georges Hatoum obtained his medical degree with honors from the Lebanese University, Faculty of Medical Sciences. His residency was completed at the Syracuse Upstate Medical University. He was then appointed as the Chief of Radiation Oncology at the Stratton VA Medical Center, NY. From 2006-2010, Dr. Hatoum worked at the Sylvester Cancer Center of the University of Miami. He carried different appointments including Associate Professor of Clinical Radiation Oncology, co-leader of the head and neck cancer site disease group as well as Associate Director of Radiation Oncology at Jackson Memorial Hospital. Dr. Hatoum serves currently as the Medical Director for the JFK Comprehensive Cancer Institute. He is the principal investigator of the NGR oncology clinical trials, and his work has been published in several prominent medical journals. Dr. Hatoum has won several awards, including America’s top Radiation Oncologists, as well as the Osler Institute award of Excellence in teaching.

Georges.hatoum@hcahealthcare.com