AbstractID: 9158 Title: Implementation of a Polymer Gel Dosimetry Insert for an Anthropomorphic Phantom Used to Evaluate Head and Neck Intensity-Modulated Radiation Therapy

The Radiological Physics Center (RPC) uses an anthropomorphic phantom to evaluate head and neck intensity-modulated radiation therapy (IMRT). The phantom currently uses film and TLD to evaluate dose distributions. This phantom has been evaluated at approximately 20 institutions to date. However, a volumetric dosimeter would supply more information for evaluating such distributions. The purpose of this project was to design a polymer gel insert for this head and neck phantom. It was hypothesized that the polymer gel would measure dose within 10% or 5mm distance to agreement (DTA) of calculated dose distributions.

A polymer gel insert was constructed and fitted within the phantom to encompass a simulated treatment region. The treatment region was defined by a separate imaging insert containing simulated planning target volumes and an organ at risk.

An evaluation using an IMRT dose delivery system was conducted using the polymer gel inserts in the head phantom. When compared *absolutely*, dose distributions measured with the gel agreed with the calculated dose distributions within 10% dose or 5 mm DTA over 88% of the area evaluated. A *relative* comparison demonstrated agreement within 5% dose or 3 mm DTA over 97% of the area evaluated.

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