

## **Dosimetric Characteristics of Partially Shielded Rectal Applicators for Clinical Application with VariSource HDR Remote Afterloading Device**

In treating early stage rectal carcinomas, endocavitary radiation using the Papillion Technique has been used as an alternative to traditional treatment with external beam radiation or surgery. The limited volume treated with this system makes it possible to give large doses of radiation per fraction. However, the short distance contact therapy units are no longer manufactured, and the long-term availability of spare parts for existing units is a concern. In addition, the treatment of posterior rectal wall lesions is problematic with these systems. Another problem is that most radiation oncology departments don't treat enough patients with rectal cancers to benefit in the cost of operating a unit.

Alternatively, a newly partially shielded rectal applicator has been designed for use with commonly available high dose rate afterloading systems for endocavitary therapy. The applicators are designed to use 90°, 180°, and 270° annular-segmented tungsten shields or can be used without shielding. These applicators are available in 5cm and 10cm lengths with diameters of 2.5cm and 3.0cm.

The goal of this project was to experimentally determine the dose distribution around these applicators using a commercial available HDR remote afterloading system. The measurements were performed in Solid Water phantom material using LiF TLD and radiochromic film dosimetry techniques according to AAPM recommendations (TG-43). The results will then be compared with Monte Carlo calculated values. Complete dosimetric data about the applicators will be presented.