

AbstractID: 10234 Title: A method to measure the output of IORT applicators used with the Axxent electronic brachytherapy system.

**Purpose:** To measure the output of IORT applicators used with the miniaturized 50 kVp X-Ray source of the Axxent electronic brachytherapy system.

**Method and Materials:** Brachytherapy dose calculations are based on a set of measured or calculated dosimetry parameters for the Axxent X-Ray source. They are used to calculate dose when the X-Ray source is surrounded by soft tissue. Clinical examples are partial breast irradiation or intracavitary vaginal applications. In situations though, where the X-Ray source is within an applicator external to the tissue, direct output measurements for the specific treatment geometry are needed. The Axxent shielded test fixture was first used to obtain a calibration factor for a pinpoint chamber. The fixture allows for both the chamber and the source to be inserted in separate channels within a phantom. The source dwell position is set directly opposite to the chamber and at a set distance. The TG43 parameters and the dwell time are used to calculate the dose at the chamber's location. The calibration factor is obtained from the chamber's reading. The applicator with the radiation source inside is then made to touch the phantom. The chamber is positioned within the phantom at the appropriate depth. The output calculation is based on the chamber's reading and the source's dwell time and is referenced to a nominal Air Kerma Strength. We have supplemented our chamber measurements with relative GAFCHROMIC film dosimetry at various depths in a Solid Water phantom.

**Results:** We have used the Axxent radiation source to deliver a single dose radiation treatment intra-operatively. A table of dwell times vs. dose for various applicators is prepared for use in the O.R.

**Conclusion:** We have found the use of a list of dwell times versus prescription dose and applicator type easy and convenient to implement during IORT cases.