# PREVENTION OF PERINEAL HEMATOMA USING THE PERINEAL PRESSURE APPLICATION DEVICE (PPAD) AFTER PROSTATE BRACHYTHERAPY

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**Presented at Radiological Society of North America (RSNA), December 2000**

Introduction:
Development of perineal hematoma is not uncommon after transperineal, interstitial prostate brachytherapy. While not a life threatening condition, it can be alarming and bothersome to the patient and may take several weeks to resolve. Most experienced implant programs advocate the use of perineal pressure applied with a sterile towel to the needle puncture sites upon completion of the implant for five or more minutes. Customarily the brachytherapist's hand is employed to exert this perineal pressure (Figure 1). This practice will dramatically reduce the incidence of perineal hematoma, however it does not conform to ALARA (as low as reasonably achievable) principles of radiation exposure. To solve this problem, we have fabricated a Perineal Pressure Application Device (PPAD). This device allows the operator to apply indirect pressure to the perineum while greatly reducing radiation exposure to the operator's hand as compared to manual application of pressure.

Materials/Methods:
Ten consecutive $I^{125}$ and ten consecutive $Pd^{103}$ prostate implant patients were evaluated to understand radiation exposure rates at the perineal surface and at a perpendicular distance of 50cm. Height and weight of all patients were recorded as well as the total number of seeds/implant, activity/seed, and total activity of each implant. The PPAD is a soft, flat rubber surface, 12.5cm in diameter attached to a 50cm acrylic broomstick handle. The flat, rubber surface of the PPAD is placed against a folded, sterile towel over the needle puncture sites immediately upon completion of the implant prior to cystoscopy (Figure 2). Pressure is then applied to the perineum using the handle of the PPAD for 5 minutes. In each case, exposure rate measurements were obtained with a Victoreen 450B Dosimeter Survey Meter. The exposure rate at the center of the needle puncture field on the perineum was measured. Exposure rate was then obtained at the handle of the PPAD, 50cm from the perineal surface. A right angle was employed to ensure a perpendicular orientation of the PPAD handle to the perineal exposure rate site of measurement. All rate measurements were obtained for a minimum duration of one minute.

Results:
Of the 20 patients evaluated in this analysis, none developed perineal hematoma within ten days after implant. There was a profound reduction in exposure rates obtained at the handle of the PPAD compared to those at the perineal surface (Table 1).

Table 1. Exposure rates with and without the use of the PPAD for both $I^{125}$ and $Pd^{103}$.

| Isotope | Number of Patients | Ave. Height (in) | Ave. Weight (Ibs) | Ave. Number of Seeds/Implant | A/Seed (mCi) | A Total (mCi) | Perineum mR/h | PPAD (50cm) mR/h |
|---|---|---|---|---|---|---|---|---|
| $I^{125}$ | 10 | 70.3 | 202.9 | 104.5 | 0.333 | 34.8 | 16.57 | 0.52 |
| $Pd^{103}$ | 10 | 68.7 | 199.8 | 97 | 1.28 | 123.66 | 9.72 | 0.015 |

Conclusion:
The PPAD is a simple way to reduce the incidence of perineal hematoma after transperineal prostate brachytherapy and greatly reduces radiation exposure to the operator's hand by a factor of 38 for $I^{125}$ and 648 for $Pd^{103}$.

Figure 1. Use of the PPAD to apply perineal pressure.