AbstractID: 3435 Title: Healing Well: a new concept for radiation therapy of breast cancer

Purpose: To propose a new concept/device, termed Healing Well, dedicating to radiotherapy of breast cancer. This objective is motivated by the need to reduce overall treatment time and to reduce toxicity observed on patients with large breasts.

Methods and Material:
The basic idea of Heal Well is to use a cup-shaped structure (well) with tens of collimated channels similar to the Gamma-Knife. Unlike the Gamma-knife, the source is provided through a HDR ^{60}Co afterloader and the beams are not narrowly focused to a small spot. The device delivers low-dose-rate radiation with patient in the prone position and the breast placed inside the well by gravity. The EGSnrc Monte-Carlo system was used to explore sample design and to compute dose distributions. A commercial ^{60}Co DHR source (Shimadzu Corp.) situated in the housing and collimating structure of the Healing Well was modeled with Monte-Carlo. Dose distribution for a hypothetical ^{60}Co ring source was calculated, and was compared with those of a 6MV and a 15MV parallel-opposite pairs commonly used.

Results:
The Monte-Carlo calculation for the ^{60}Co HDR source showed that a dose rate of approximate 2 cGy/min was produced at a distance of 15 cm. This dose rate may be too low, thus, source strength should be increased. The calculation for the ring source shows that the ^{60}Co is as penetrating as the 15 MV beam and produces even more uniform dose distribution than the 6 and 15 MV pairs, indicating that the ^{60}Co in the Healing Well configuration has sufficient penetration for large breasts.

Conclusion: This work propose a new concept/device that is dedicated to treat breast cancer by irradiating the breast inside a well. The technology has a potential to improve cosmetic outcome and/or quality of life for breast cancer patients, particularly for those with large, pendulous, breasts.