

Purpose:

To determine whether corrections of electron beam dose per MU for treatment distance can be refined.

Methods:

The output of standard electron applicators was measured for all energies at distances ranging from 100 cm SSD to 125 cm SSD with data used to compute the average effective SSD per text-book methods. At each distance of measurement an effective SSD was computed that would yield an output equal to the measured output.

Results:

A single value of effective SSD determined in standard manner from a plot of the square root of I_0/I vs. gap yielded calculated output that differed from measured values by more than 3% in some situations. A plot of the alternate effective SSD computed at each value of gap vs. gap showed a linear relationship with negative slope for some applicators and energies and a positive slope for others. The point effective SSD differed for some combinations by more than 10 cm over the range of gaps tested.

Conclusions:

A simple linear variation in effective SSD as a function of gap is easy to determine and implement into calculations and can reduce differences between calculation and measurements to less than 1%. This does not obviate the need to assess cut-out factors at the actual treatment distance but should facilitate SSD corrections for standard sizes.