Brass Mesh Bolus. An alternate to tissue equivalent bolus material.

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The aim of this project was to evaluate a brass mesh material used to increase the radiation dose at or near the skin surface. This material has been used in place of tissue equivalent bolus material on chest wall patients until a clinical response (arrhythmia) to the skin was reached. Measurements were made with 6MV photons on a Varian 2100EX linear accelerator using an Exradin parallel plate ionization chamber in solid water phantom. Using multiple layers of brass mesh, measurements at 100 ssd in a phantom perpendicular to the beam central axis were made. The results show that the dose at 4-mm depth increases from 77% with no bolus to 94% using 3 layers of brass mesh. The dose maximum depth shifts from 15 mm for the open field to 9 mm for 3 layers of brass mesh. Using a 30-degree wedge and the gantry positioned at 40 degrees increased the dose at 4 mm to 97%. The depth of dose maximum for this configuration was 9 mm. Attenuation of the photon beam increases with additional layers of brass mesh. Attenuation is 1.7% at 4cm for 3 layers of brass mesh. These results indicate that low energy electrons produced by the brass mesh contribute to increased dose up to 15 mm. Past 15 mm depth these electrons no longer contribute dose and attenuation of the beam by the brass mesh becomes noticeable.