Theme: Physics

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Abstract Title: High-efficiency Film-less Implementation for Routine Winston-Lutz Test in a PBS Gantry Room

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Background / Aims:

- To propose a more efficient method for performing the Winston-Lutz test as part of routine QA in proton PBS gantry rooms, eliminating the need for dosimetry films. While commercial systems for this purpose exist, they are often costly and less accessible. In contrast, the Lynx PT scintillation detector—or similar devices—is more widely available in proton therapy centers. Our approach utilizes the Lynx PT and the myQA platform (IBA Dosimetry) as a practical and cost-effective alternative to evaluate the isocentricity of single proton spot and metallic BB.

Subjects and Methods:

- In this work, the Lynx PT was mounted on the gantry as the measurement device in place of films (Figure 1). The Lynx PT was shifted to an offset position using a dedicated mounting frame to avoid collision with the fixed and well-aligned BB. The detector was carefully positioned along the beam direction to allow the kV imaging panels to extend into place.
- The BB was initially aligned to the imaging isocenter using orthogonal kV images taken at multiple gantry angles. With the BB fixed in position, a single isocentric proton spot at energies between 70-225 MeV was delivered at different gantry. MU/spot and the Lynx Iris setting were optimized to ensure appropriate contrast and avoid saturation. Orthogonal kV images were acquired at each gantry angle to assess imaging isocentricity, without re-adjusting the BB position. Data analysis was performed instantly using the Lynx plug-in of myQA platform (Figure 2).

Fig1.

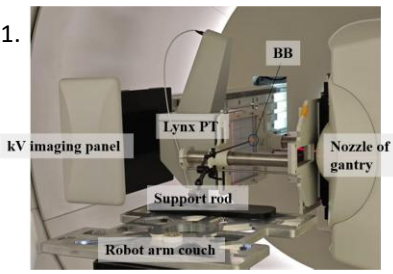
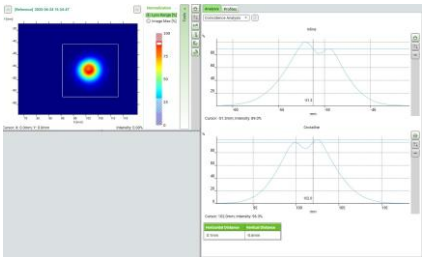


Fig2.



Result:

- Figure 3 shows an example of test results. The setup, data acquisition and analysis procedure using the Lynx PT have proven effective in our routine QA at our institution. This film-less approach eliminates the need for costly dosimetry films and significantly reduces the time required for the QA task. Moreover, the method can be readily implemented with other high-resolution flat-panel detectors similar to Lynx PT, making it a practical option for many proton therapy facilities.

Fig3.