Introduction: The measurement of three-dimensional dose distributions for the treatment of small volumes in the head remains a challenge. Current methods lack either one dimension or impose significant technical and financial burdens

Methods: A technique is presented to approach this problem using multiple layers of the new Extended Dose Range film by Kodak (EDR2) in a light-tight cubical phantom made of black PMMA (Lucite). Poking a needle through channels in the phantom uniquely marks the orientation and z-position of each film piece. For the measurements the film cube is placed in a PMMA head phantom consisting of a 20.32-cm-diameter cylinder with a seamlessly attached hemisphere.
An H&D curve of the EDR2 film has been recorded to investigate its properties and to calibrate the scanner software.

Results: The OD of the EDR2 film is an almost linear function of the dose for up to about 5 Gy and remains dependent on it for up to 10 Gy.
A stereotactic treatment plan that had been delivered to the phantom reproduced well on the films.

Conclusions: Using the Extended Dose Range film in the custom phantom with a light-tight film cube enables the verification of stereotactic treatment plans for small volumes. The range of the EDR2 film does not allow applying the full dose of a typical stereotactic treatment to it, but the film has the advantage of covering a significantly wider dose range than standard radiotherapy film, giving a better resolution.