AbstractID: 13032 Title: Evaluation of missing tissue compensators for conventional dose calculation techniques on Pinnacle treatment planning system version 7.6c

Purpose: To validate the accuracy of missing tissue compensators in conventional techniques calculated by the Pinnacle 3D treatment planning system version 7.6c. **Method and Materials:** For the Pinnacle version 7.6c, the density in g/cm^3 of lead material and the distance from the source to the top of the compensator tray were specified. Lead sheet thicknesses were entered manually pixel by pixel to create the compensators dimension and position corresponding to the missing surface until the isodose profiles were uniform. In solid water phantoms, the lead sheet missing tissue compensators were designed in the conventional techniques at depth 5 and 10 cm. The thicknesses of 1, 3, 5 and 7 cm of step solid water phantoms was used to simulate as a missing tissue. Kodak X-Omat V film was used to verify the 1D dose profiles. OmniPro-I'mRT software analysis was employed for the dose comparison between measurement and calculation. **Results:** The study showed that, the missing tissue thicknesses of 1, 3, 5 and 7 cm need to be compensated using lead sheets thicknesses of 0.65, 2.06, 3.62 and 5.42 mm, respectively. The difference of all dose profiles between the Pinnacle 3D treatment planning and the film measurement are within 3% which agree in the criteria of TRS 430 protocol. **Conclusions:** The missing tissue compensators using the Pinnacle 3D treatment planning version 7.6c establish the uniform dose distributions for 1D profile comparison which can be applied in clinical situations.