AbstractID: 14002 Title: Evaluation of the Effect of the Head Holder Base Plate on Head/Neck RapidArc Plans

Purpose: Unlike conventional IMRT head and neck (H&N) treatment planning, attenuation due to the head-holder base plate t cannot be accounted for manually in RapidArc planning due to the dynamic arc beams used. While precisely taking into account head-holder plate attenuation is not trivial in routine clinical practice, it is necessary to evaluate this effect on dose calculation and delivery in order to provide a quantitative basis for clinical decision-making.

Materials & Methods: In order to quantitatively account for the head-holder attenuation in RapidArc planning, we contoured the entire head holder and included it as part of the patient external structure. This is not trivial for routine treatment planning. RapidArc treatment planning was performed with the head-holder base plate in place. We then created a verification plan using the original leaf sequence and MUs and the original image set that does not contain the head-holder plate. We further verified the calculation results with Iba MatriXX phantom measurements, with and without the head-holder plate.

Results: The difference in the dose-volume-histogram between the plan with the head-holder plate and the verification plan without the head-holder plate is generally within 0.6% for all of the structures. The mean dose to the PTV differed only by ~0.5%. The difference in the measured dose for the treatment plans with and without the head-holder plate is also small, up 0.7% in the plateau region. The points of largest gamma show a 2.0% dose difference in the high dose region, while all measurement points pass our 3 mm/3% acceptance criteria.

Conclusions: Our calculation and experimental results demonstrate that the dose difference with and without the head-holder base plate is well within our clinical quality assurance criteria. It is therefore acceptable to omit the head-holder plate in H&N RapidArc treatment planning for convenience.