clinically acceptable, however the H&N FFF plans have lower pass rates. This can be related to the MLC modulation needed to compensate for the inhomogeneous beam profile using FFF for larger targets. Same trend is seen for the lung treatments, where there is a range of target sizes.

			FFF		FF		
			mean	SD	mean	SD	p
Brain	PTV [Gy]	mean	59.5	0.6	59.3	0.7	0.23
		D2	62.1	0.4	61.9	0.4	0.02
		D98	55.5	1.8	55.4	2.2	1.00
	Body [Gy]	mean	17.4	4.7	17.9	4.9	0.002
	Beam on [sec]		69	22	68	21	0.46
	MU		230	54	215	45	0.004
	Pass rate [3 mm,3%]		99.7	0.5	99.9	0.2	0.31
H&N	PTV [Gy]	mean	65.7	0.3	65.7	0.3	0.32
		D2	68.4	0.8	68.3	0.8	0.19
		D98	62.6	0.6	62.9	0.4	0.06
	Body [Gy]	mean	20.7	2.6	21.0	2.7	0.05
	Beam on [sec]		124	9	118	8	0.002
	MU		389	32	341	27	0.002
	Pass rate [3 mm,3%]		98.6	1.3	99.6	0.3	0.004
Lung	PTV [Gy]	mean	65.6	0.98	65.6	0.9	0.43
		D2	69.6	0.87	69.1	0.7	0.03
		D98	60.4	3.82	61.1	3.7	0.01
	Body [Gy]	mean	12.9	5.26	13.0	5.3	0.02
	Beam on [sec]		66	7	67	11	0.54
	MU		315	109	277	86	0.002
	Pass rate [3 mm,3%]		98.8	2	99.7	0.3	0.06

Conclusions: Clinically acceptable FFF treatment plans can be created and delivered for normally fractionated treatments in all three anatomical sites. The reduced head scatter from removing the flattening filter produces reduced total body dose, which could be clinically relevant to the aim of reducing secondary cancers.

PO-0863

Dosimetric testing of the new aS1200 MV imager with FF and FFF beams

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Purpose/Objective: Evaluation of the characteristics of the new EPID PV-aS1200 by Varian for its dosimetric usage with the GLAaS algorithm, where a dedicate configuration phase allows to convert the EPID reading into absorbed dose to water.

Materials and Methods: The new PV-aS1200 imager has an active area of a 40x40cm^2 (1190x1190 pixel), with a backscatter shielding included in the new cassette engineering. Its intrinsic characteristics were investigated on an Edge accelerator equipped with 6X, 6FFF, 10FFF beams. For the same energies, data were also compared to PV-aS1000 acquisitions from a TrueBeam.

A first level of investigations covered signal linearity with dose, response to primary and transmitted radiation, saturation relative to dose and dose rate, arm backscatter as a function of field size, ghosting. After that first detector assessment, the robustness of the GLAaS dose calibration process was evaluated in terms of absolute absorbed dose, relative output factors and profile parameters.

Finally, GLAaS was validated for aS1200 as pre-treatment QA tool for RapidArc plans, covering different dose/fraction prescriptions. The mutual position of the detector and the linac head was measured in a cine mode during full rotations.

Results: For all energies, aS1200 readings showed an optimal linearity relative to MU (R^2=1.00), with a residual deviation less than 0.5% for more than 3MU. The detector response to primary and transmitted radiation was modelled and showed to be similar to the aS100 detector. The aS1200 confirmed to have no saturation for measurements at isocenter and the maximum dose rate (1400 and 2400 MU/min for 6 and 10FFF respectively). The arm backscatter variation with field size is now compensated with the new engineering. Consequently the dose calibration according to the GLAaS model was successfully implemented, allowing QA for all beams with no limitations of field size or dose rate.

Comparison between measured dose map and TPS calculated dose in water was assessed through the Gamma Agreement Index GAI, for different DTA and ΔD criteria, resulting in GAI > 95% (2%, 2mm criteria).

Conclusions: The new aS1200 detector improved the performance of the previous aS1000, with no more limitation in terms of field size and/or dose rate. The effective resolution of arm backscatter allows a more robust usage of the new detector. The usability for pre-treatment QA for RapidArc cases is confirmed in all conditions, from stereotactic to very large volumes, from common to very high dose rates.

Poster: Physics track: Treatment planning calculation, optimisation

PO-0864

Pareto front investigation of TomoTherapyís plan quality range

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Purpose/Objective: By creating Pareto fronts for Helical TomoTherapy (HT) plans, the influence of field width (FW), modulation factor (MF) and pitch on the plan quality can be investigated and Pareto optimal combinations can be deduced.

Materials and Methods: For every oropharyngeal cancer patient out of five, 90 TomoEdge plans were made (each with a unique combination of MF and pitch) [1-2]. The homogeneity index (HI), conformity index (CI), $D_{near\text{-}max}$ (D2) and $D_{near\text{-}min}$ (D98) of the PTVs were plotted in a Pareto front