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**RADIOSURGICAL CENTER
OF MEMPHIS**

Quality Assurance and Clinical Experience of MASEP Rotating Gamma System(INFINI)

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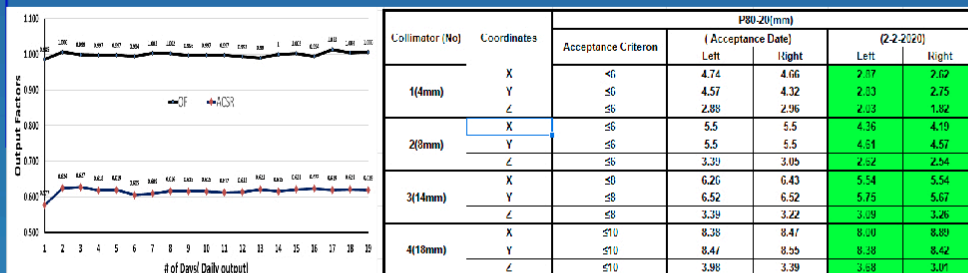
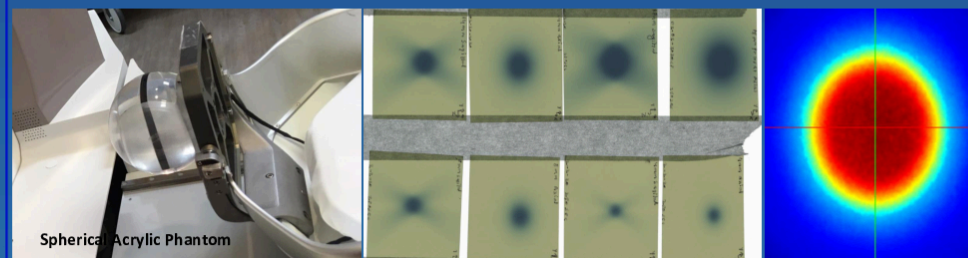
INTRODUCTION

Infini consists of 30 Cobalt-60 sources (250Ci/source) contained within the source body which rotates with the collimator body synchronously to deliver the SRS treatment. Beam modulating ON/OFF switches are continuously regulated by a computerized control system.

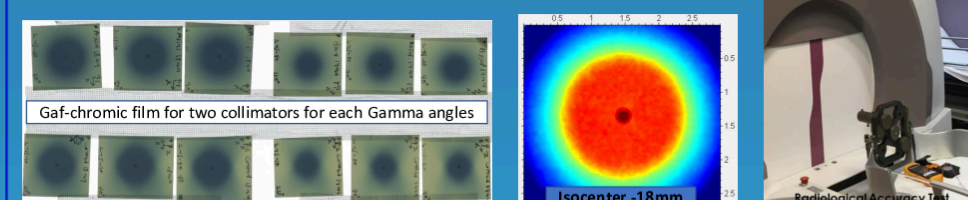
METHOD

1. Pre-treatment QA : Monitor the alignment of the rotating bodies(Isocentricity), output constancy, Source on/off switches and the sub-mm table positioning accuracy (0.05/1000mm) 2. Determine Full Width at Half Maximum (FWHM), Penumbra 80-20% (P80-20%) and geometrical isocentricity periodically using Gafchromic films. 3. Periodic End-to-End test to confirm the geometrical positioning of the shots, MRI fiducials alignment and verify dose distribution.

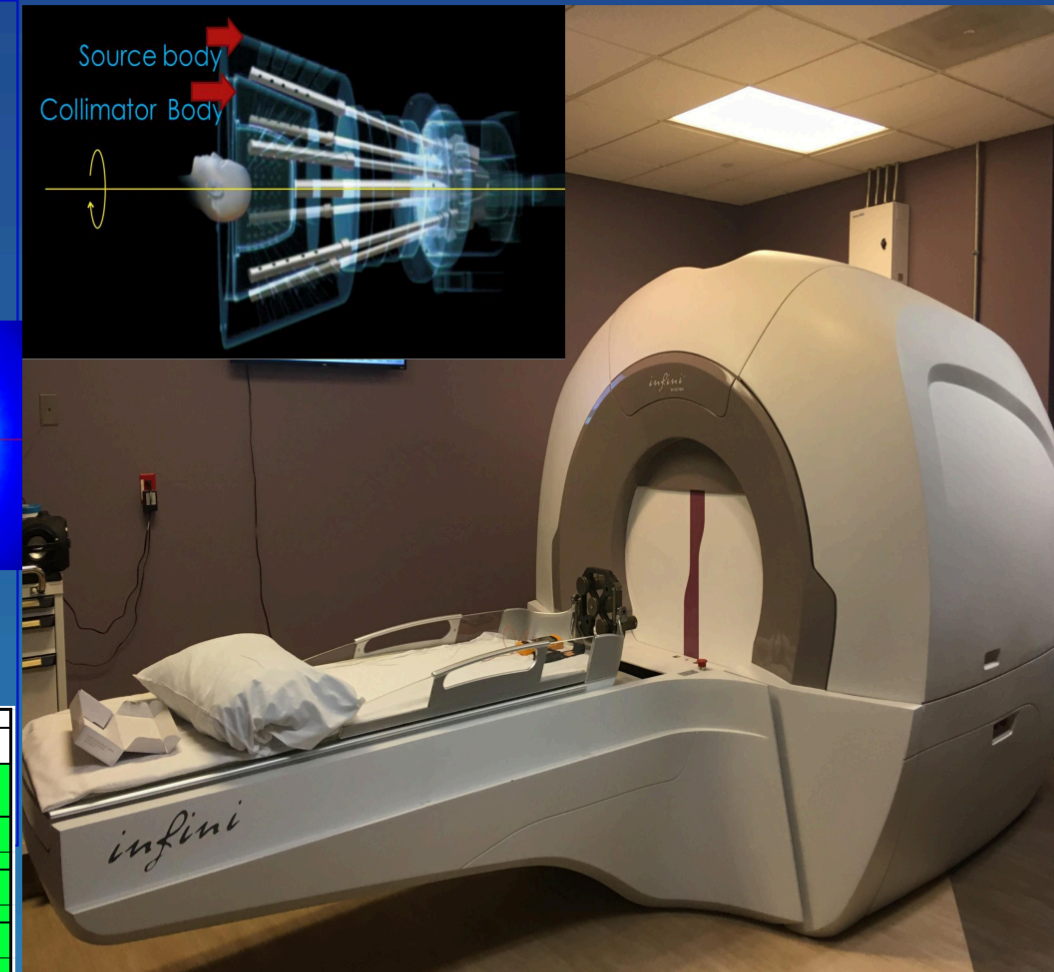
The alignment of the collimator & source body ratio (ACSR<0.61) is 0.615 ± 0.011 on average. Daily output of an 18mm collimator is 0.999 ± 0.006 on average and is verified every day before the treatment. Measured FWHM and P80-20% for each collimator are within measured with Gafchromic film and analyzed using RIT. All the results are within an acceptable range compared to the Acceptance and Preventive Maintenance Inspection report.



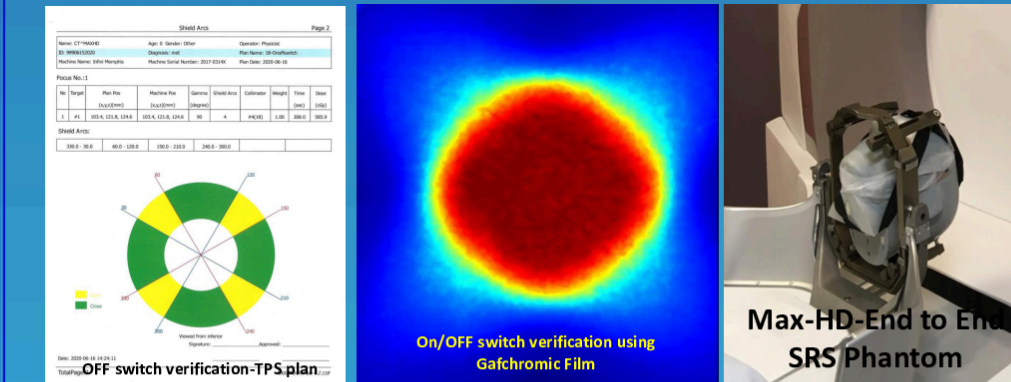
Isocenter for all collimators (Diameter: 18mm, 14mm, 8mm, and 4mm) with all gamma angles (70, 90, and 100) is less than 0.13mm.



Collimator (No)	Coordinates	Acceptance Criterion	Gamma Angle 90		
			Acceptance Date	PMI	Measured
1(4mm)	X	0.3 mm	0.08	0.05	0.12
	Y	0.3 mm	0.05	0.04	0.01
	Z	0.3 mm	0.09	0.03	0.09
2(8mm)	X	0.3 mm	0.05	0.09	0.03
	Y	0.3 mm	0.04	0.03	0.07
	Z	0.3 mm	0.04	0.05	0.05
3(14mm)	X	0.3 mm	0.09	0.04	0.04
	Y	0.3 mm	0.09	0.04	0.08
	Z	0.3 mm	0.05	0.04	0.01
4(18mm)	X	0.3 mm	0.11	0.05	0.03
	Y	0.3 mm	0.05	0.05	0.07
	Z	0.3 mm	0.09	0.09	0.13



On/Off switch and dose verification using Max-HD-END to End SRS Phantom. Point dose for three collimator(18mm,14mm and 8mm) matched less than 2% compared to dose from Super plan(TPS) using A16 Ion chamber. Collimator #1(4mm) will verified in the future using smaller chamber.



Collimator	Measured Dose(A16)(cGy)	TPS dose(cGy)	Error(%)
#4(18mm)	574.2	585.8	1.98
#3(14mm)	593.1	601.5	1.39
#2(8mm)	585.3	586.8	0.26

AIM

Develop a Quality Assurance(QA) program of the newly commissioned MASEP Rotating Gamma System (RGS) for Stereotactic Radiosurgery. Exam the reliability and performance of the hardware and software pertaining to the RGS per TG 42

CONCLUSIONS

This rotating gamma system(Infini) is accurate, reliable, and shows safe delivery of the radiation dose for SRS treatments with sub-millimeter accuracy. A periodic and robust quality assurance procedure is developed to assure the proper monitoring of this dynamic system.

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