


Tomotherapy and Patient QA (Part 2)

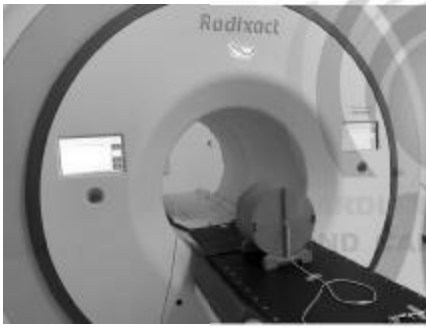


Aliasghar Rohani
Medical Physicist

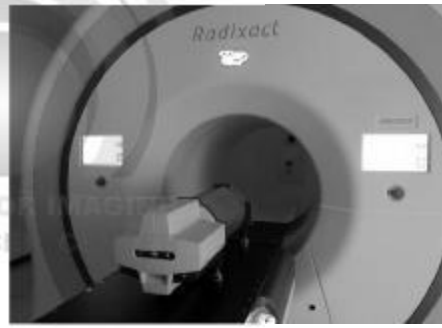
1

Tomo Patient Specific QA

Cheese Phantom

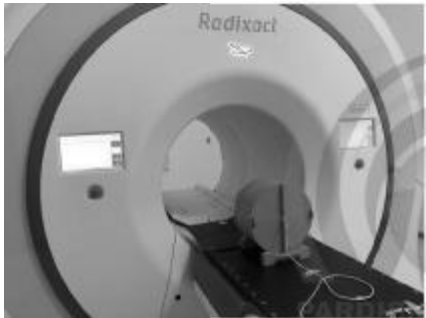


Delta4+ Phantom




2


Tomo Patient Specific QA (Cheese Phantom)



Standard Imaging A15L
"Slimline Miniature Shonka Chamber"



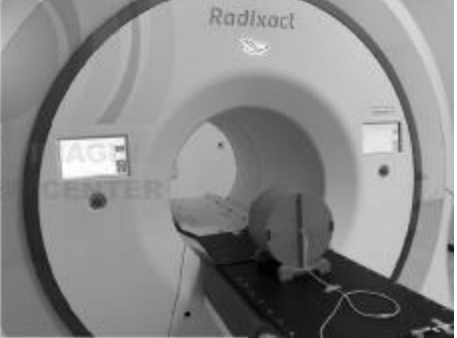
Collecting Volume:	0.955 cm ³
Nominal Calibration Factor:	60.14152
Centroid of Collecting Volume:	4.7 mm from tip of chamber
Collector Diameter:	1.8 mm
Outside Diameter of Shell:	6.25 mm
Wall Thickness:	1.7 mm
Shell, Collector, and Base Material:	A15L - Shonka AA-Epoxi plastic 0552



3

Tomo Patient Specific QA (Cheese Phantom)

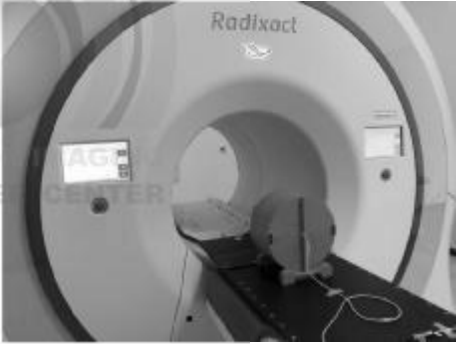

- ❖ It is Possible to measure 8 points in one radiation ,but it's not practical.
- ❖ Measure the dose in horizontal and vertical direction of phantom's center.



4

Tomo Patient Specific QA (Cheese Phantom)

- ❖ It is Possible to measure the dose distribution on the film.



5

Other Uses

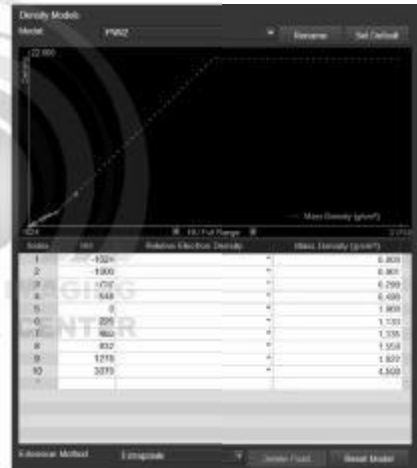
- CT number calibration



6

Other Uses

- HU-Density Curve



7



Tomo Patient Specific QA



8

Tomo Patient Specific QA (Delta4+ Phantom)


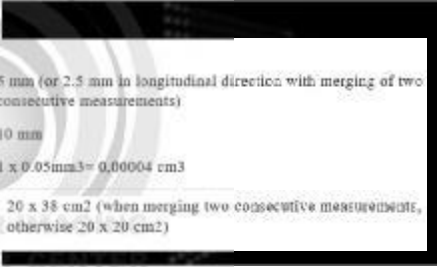
1069 P-type Diodes

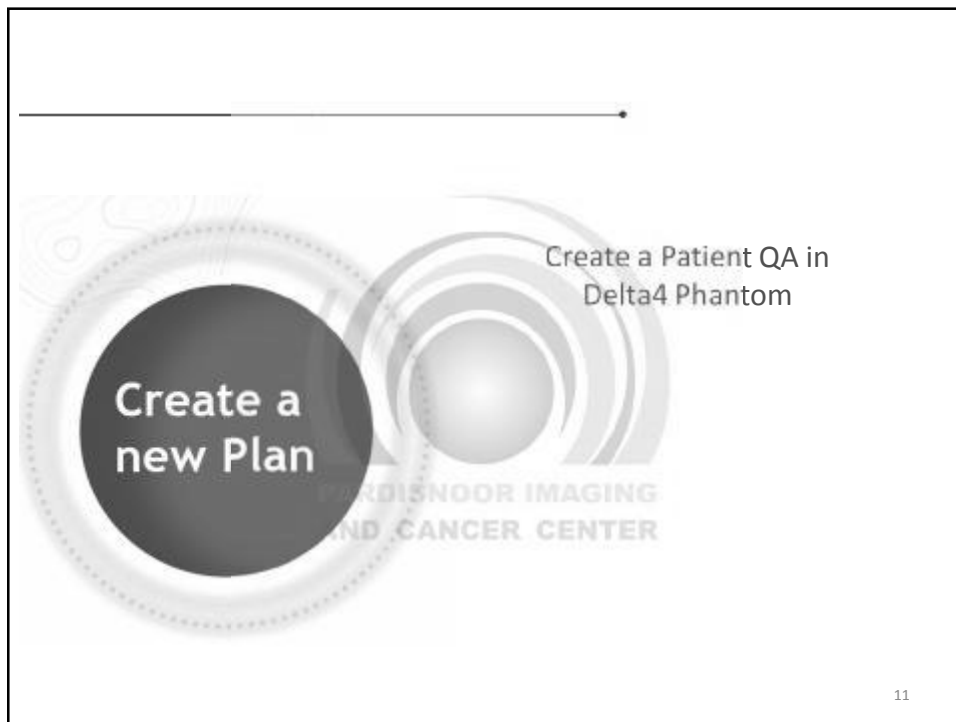
9

Tomo Patient Specific QA (Delta4+ Phantom)

Distance between detectors	5 mm (or 2.5 mm in longitudinal direction with merging of two consecutive measurements)
Central area (6 x 6cm²)	10 mm
Outer area	$1 \times 0.05 \text{mm}^3 = 0.00004 \text{cm}^3$
Size (radial x axial)	20 x 38 cm ² (when merging two consecutive measurements, otherwise 20 x 20 cm ²)
Max field size	

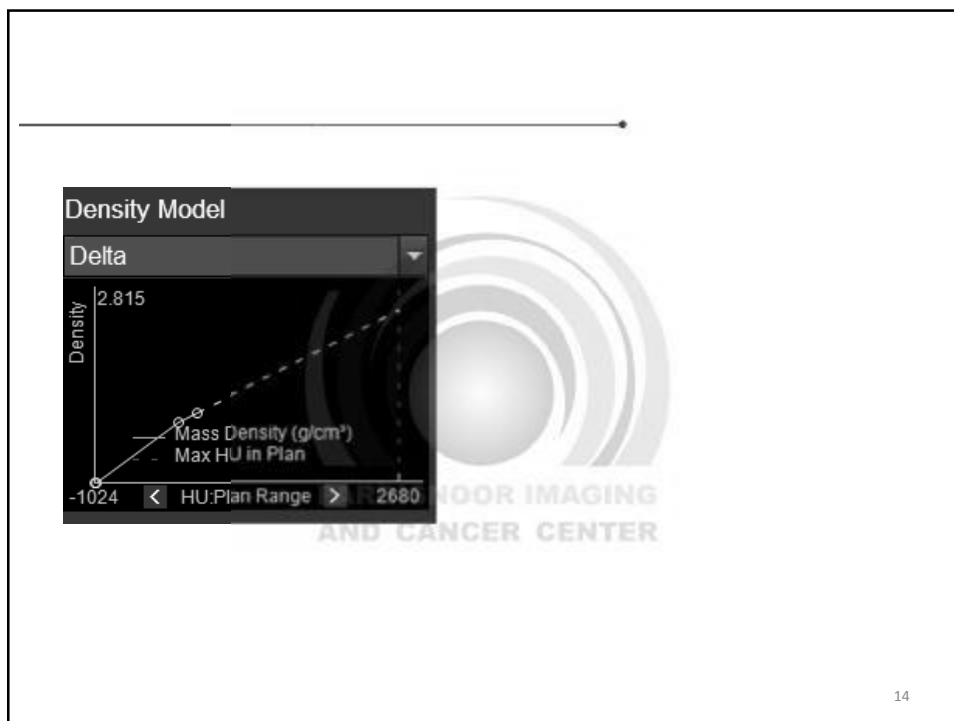
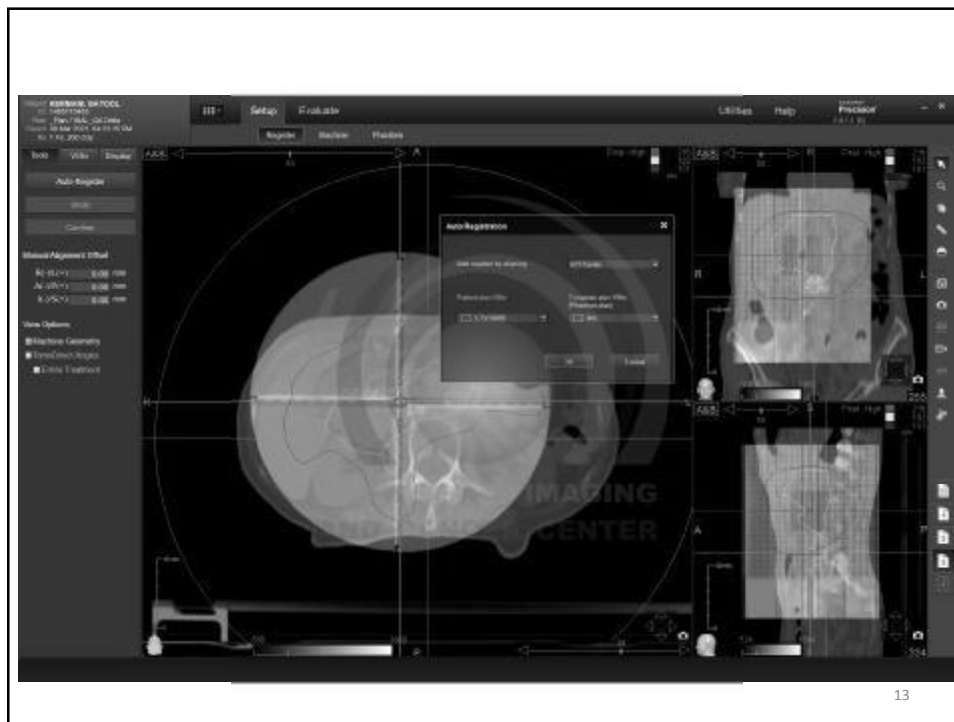
10

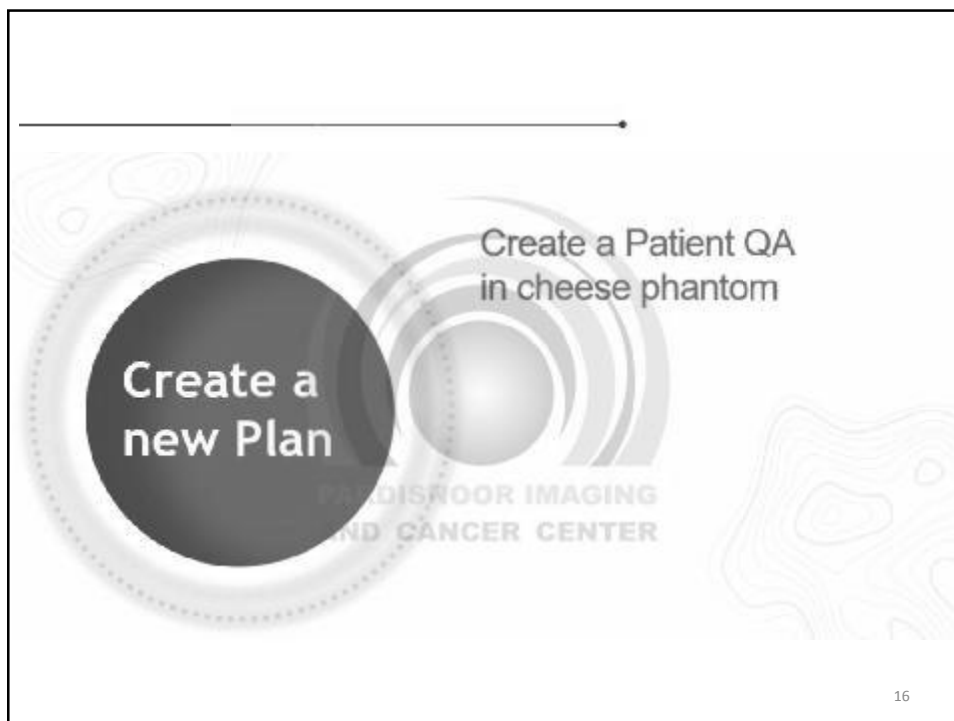
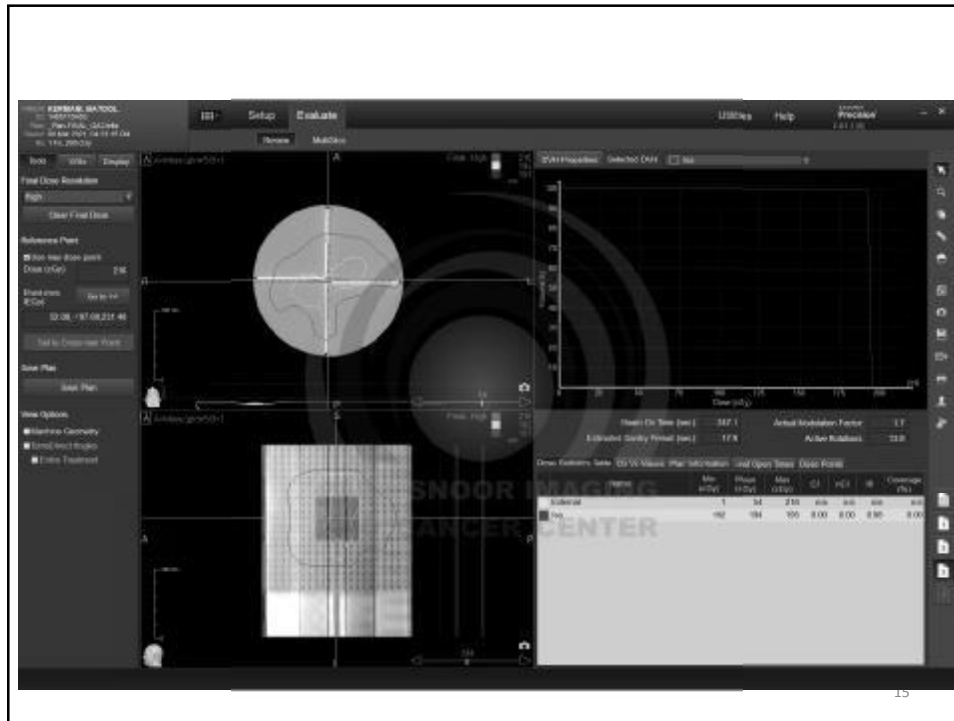


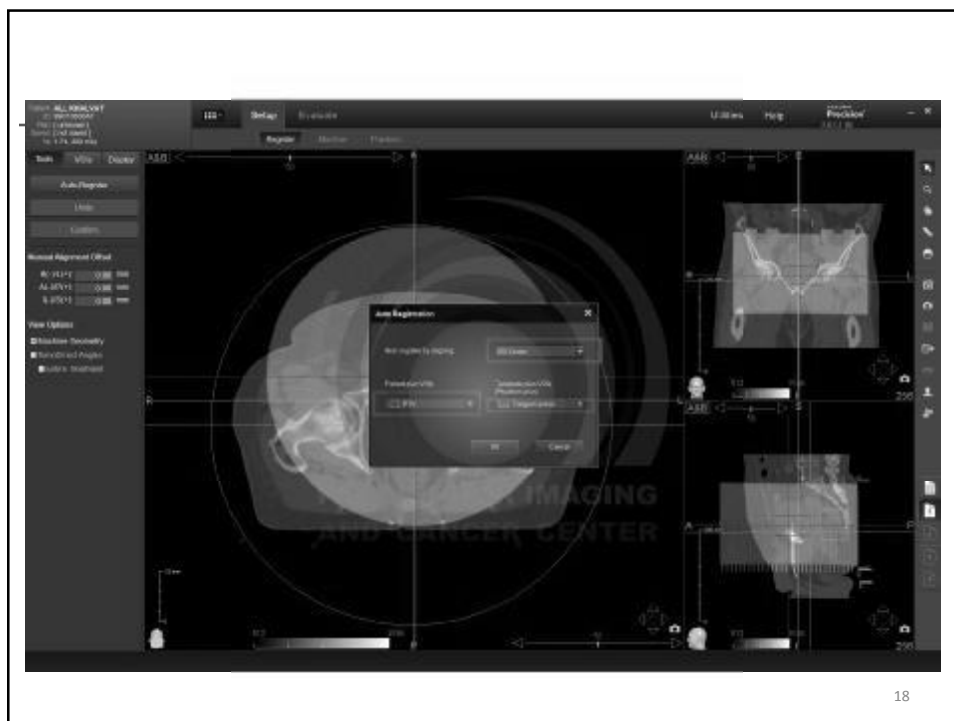
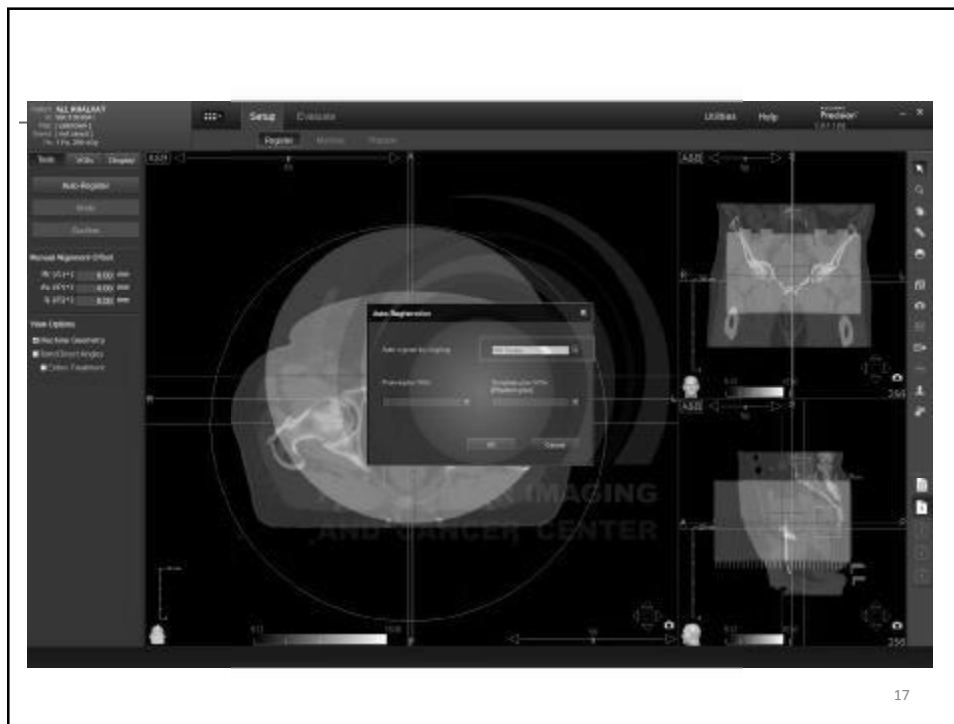
11

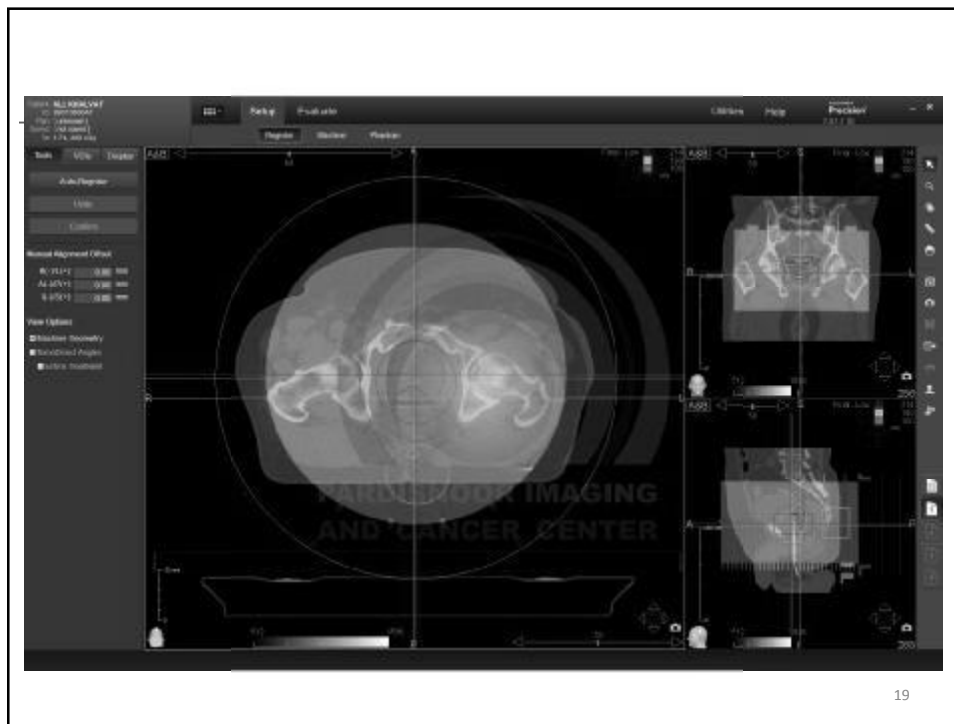


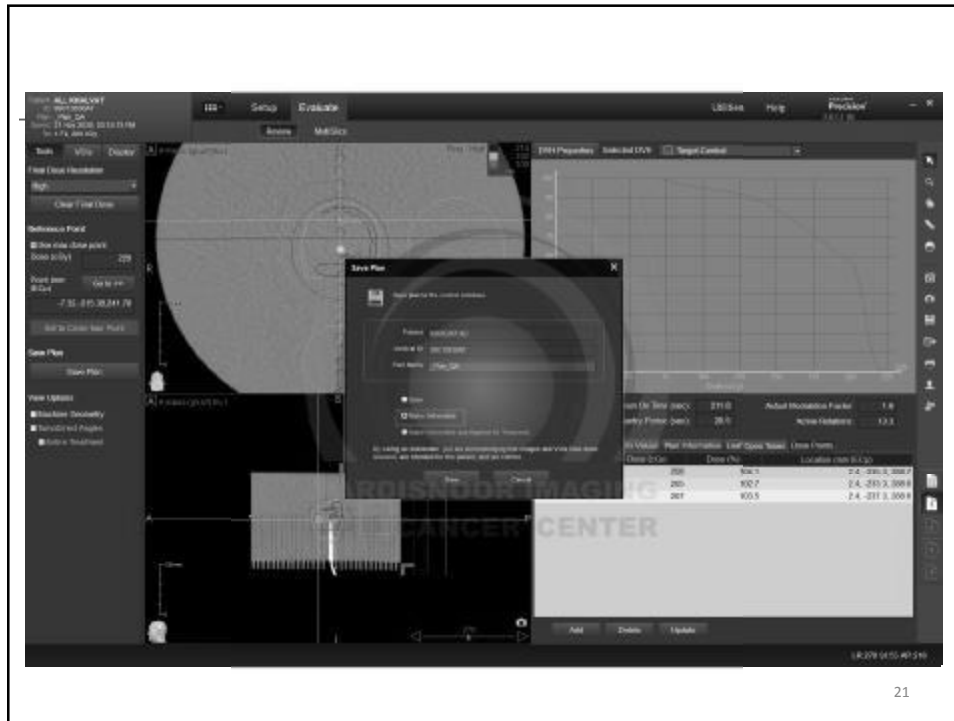
12









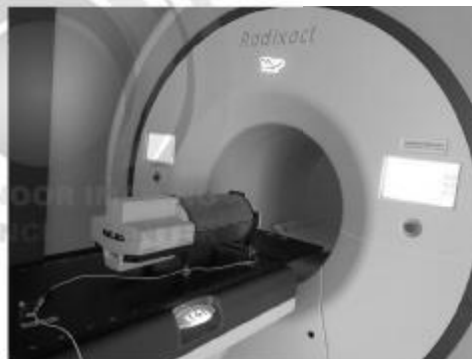


21

Patient Specific QA

What We need to do before Using Delta4+ for Tomo Patients QAs:

- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference
 - 4) Absolute




22

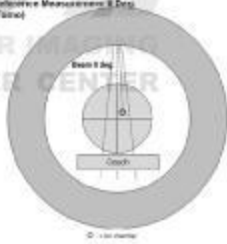
Patient Specific QA

What We Did to Use Delta4+ for Tomo Patients:

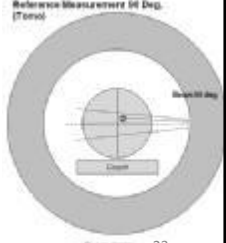
- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference**
 - 4) Absolute



Reference Measurement 8 Deg
(Tomo)



Reference Measurement 90 Deg
(Tomo)

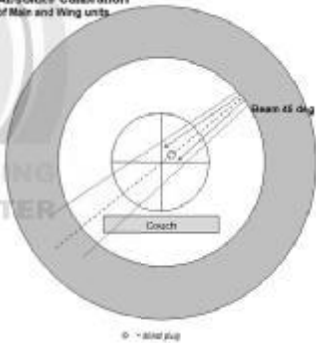


Field Size: 20 x 5 cm field static beam
Gantry: 0 and 90 degree
Beam duration: 60 S

Patient Specific QA

What We Did to Use Delta4+ for Tomo Patients:

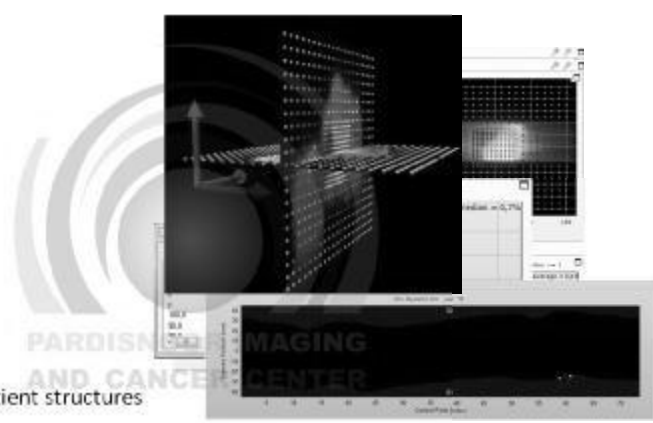
- Delta4 Phantom+ calibration:
 - 1) Relative
 - 2) Directional
 - 3) Reference
 - 4) Absolute**




Field Size: 20 x 5 cm field static beam
Gantry: 45 degree
Beam duration: 60 S

Delta4+ Software Capabilities

- Algorithms
 - 3D Gamma,
 - 3D DTA,
 - Dose deviation
- Display
 - 3D,
 - 2D,
 - 1D
 - Histograms
 - Tables
 - Together with Patient structures






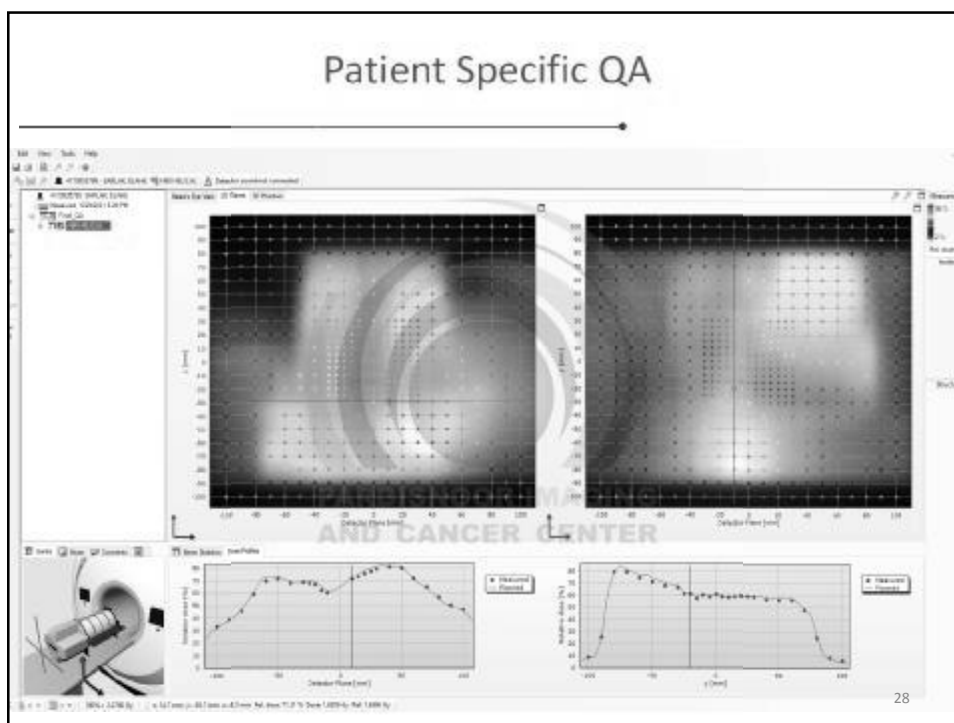
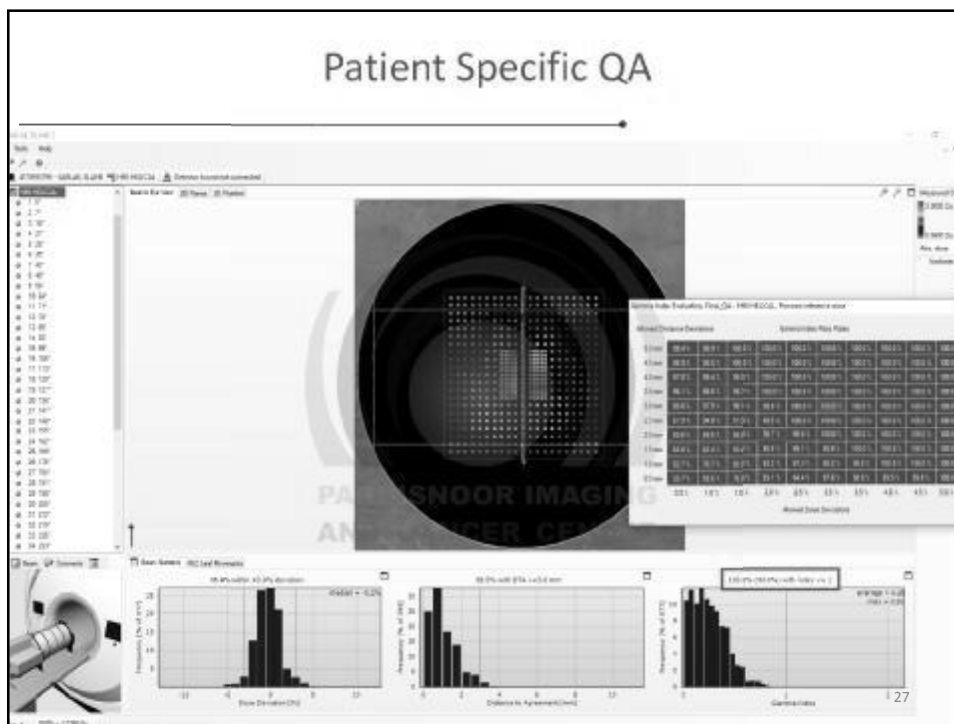
Patient Specific QA

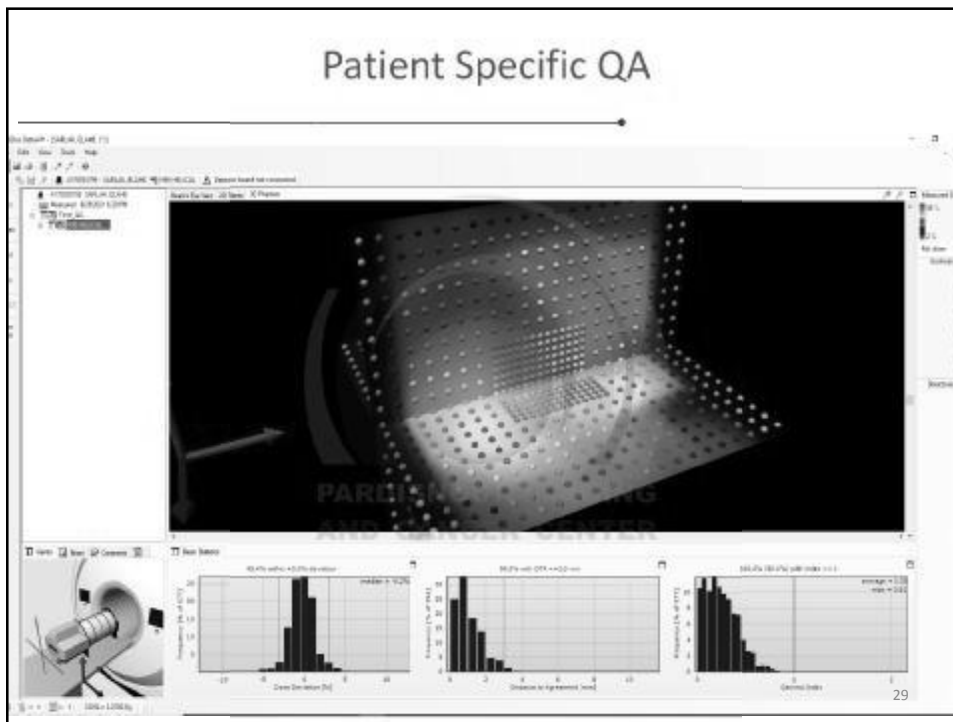
Case #1

- 47 years female
- Oral Tongue
- LN positive
- CTV54 – CTV60 – CTV64
- Duration: 240 sec



26





Patient Specific QA in Pardis

We in Pardis Noor niloo cancer center :
Have treated 250 cancer patients with Radixact .
The average gamma pass rate :

98.75% , 3% 3mm
88.47% , 2% 2mm

PARDISNOOR IMAGING
AND CANCER CENTER

30

Synchrony


- Real-time tracking technology.
- This technology using image guidance and camera to model the motion of the target and synchronizes the delivery of radiation with this motion using the jaws and multi-leaf collimators (MLCs).





4D Patient QA (HexaMotion)

- Simulates patient breathing motion in PSQA
- 6 degrees of freedom



32

Thank You For Your Attention



33