

## Boost:

I approached my boost plan in much the same way. I figured because the volume was not so long, I could use my 3-arc technique. These avoidance sectors are slightly different because when the initial plan failed QA, we started treatment with the boost plan. Patient was getting chemo and we could not delay. However, in a case like this, you can use the same avoidance angles.

The screenshot displays a radiotherapy planning software interface with four main views: Axial, BEV (Beam's Eye View), Frontal, and Sagittal. The interface includes a dose distribution table and a table of avoidance sectors.

Fields	Dose	Field Alignments	Plan Objectives	Optimization Objectives	Dose Statistics	Reference Points	Calculation Models	Plan Sum
I	CBCT	STATIC-1	D-2300CD - 6X	VMAT	0.000	Varian IEC	0.0	0.0
I	5CW	ARC-1	D-2300CD - 6X	VMAT	0.924	Varian IEC	181.0 CW 179.0	10.0
I	6 CCW	ARC-1	D-2300CD - 6X	VMAT	0.974	Varian IEC	179.0 CCW 181.0	350.0
I	7 CW	ARC-1	D-2300CD - 6X	VMAT	0.503	Varian IEC	181.0 CW 179.0	90.0
I	RLKV	STATIC-1	D-2300CD - 6X	VMAT	0.000	Varian IEC	270.0	0.0
I	APKV	STATIC-1	D-2300CD - 6X	VMAT	0.000	Varian IEC	0.0	0.0

Avoidance Sectors						
Group	Field ID	Couch Angle [deg]	Collimator Angle [deg]	Gantry Rotation [deg]	Avoidance Sector 1	Avoidance Sector 2
	5CW	0.0	10.0	181.0CW179.0	221.0	325.0
	6 CCW	0.0	350.0	179.0CCW181.0	125.0	45.0
	7 CW	0.0	90.0	181.0CW179.0	221.0	125.0

The structures created are the same as the initial plan but are cropped to the PTV\_Bst\_Opt

Here are BEV of the fields:

File Edit View Insert Evaluation Tools Window

2.0 cm 2.0 cm 179.0 deg

Selection Contouring Image Registration External Beam Planning Brachytherapy Planning Brachytherapy 2D Entry Plan Evaluation

test - Unapproved - BEV - SAD 100 cm - 5CW - 1/178 - 181.00 [deg] - C1\_ESOPHAGUS

test - Unapproved - BEV - SAD 100 cm - 6 CCW - 1/178 - 179.00 [deg] - C1\_ESOPHAGUS

110.0  
105.0  
100.0  
95.0  
90.0  
85.0  
80.0  
75.0  
70.0  
65.0  
60.0  
55.0  
50.0  
45.0  
40.0

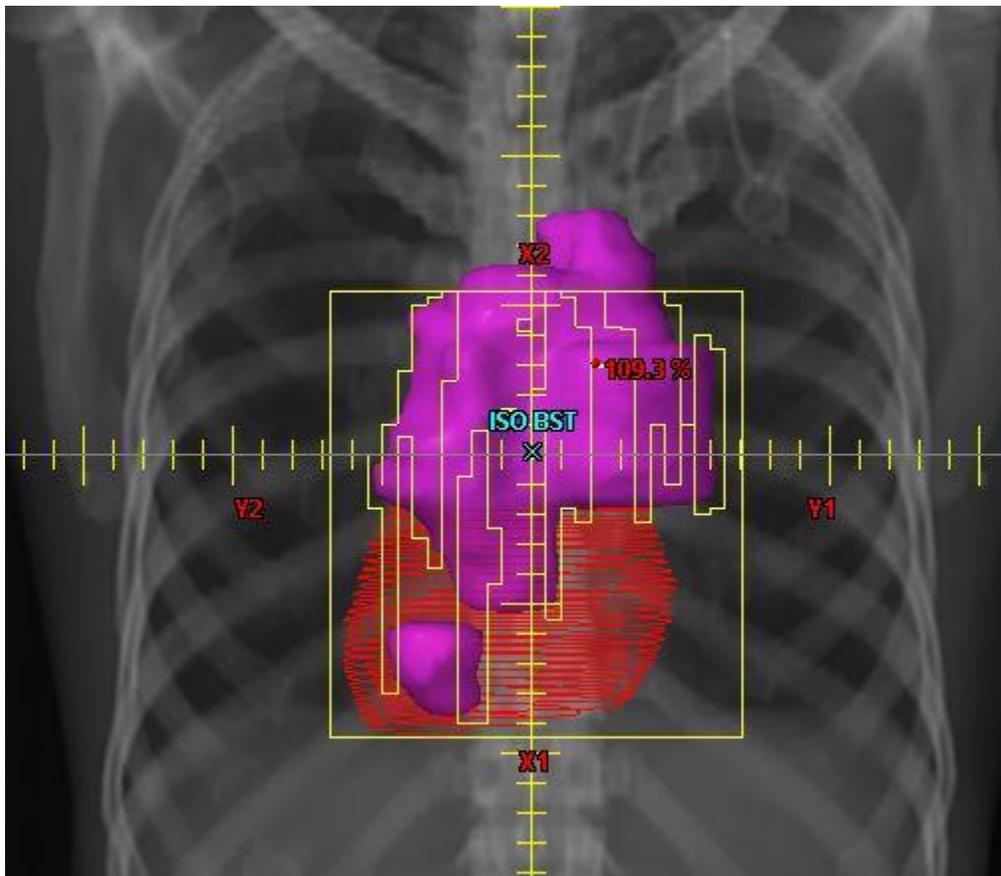
3D Dose Max: 109.3 %  
3D Max Dcr: PTV50: 109.1 %  
3D Min Dcr: PTV50: 59.4 %  
3D Mean Dcr: PTV50: 103.3 %

3D Dose Max: 109.3 %  
3D Max Dcr: PTV50: 109.1 %  
3D Min Dcr: PTV50: 59.4 %  
3D Mean Dcr: PTV50: 103.3 %

Standard Head First-Supine

Fields Dose Reference Points Dose Statistics

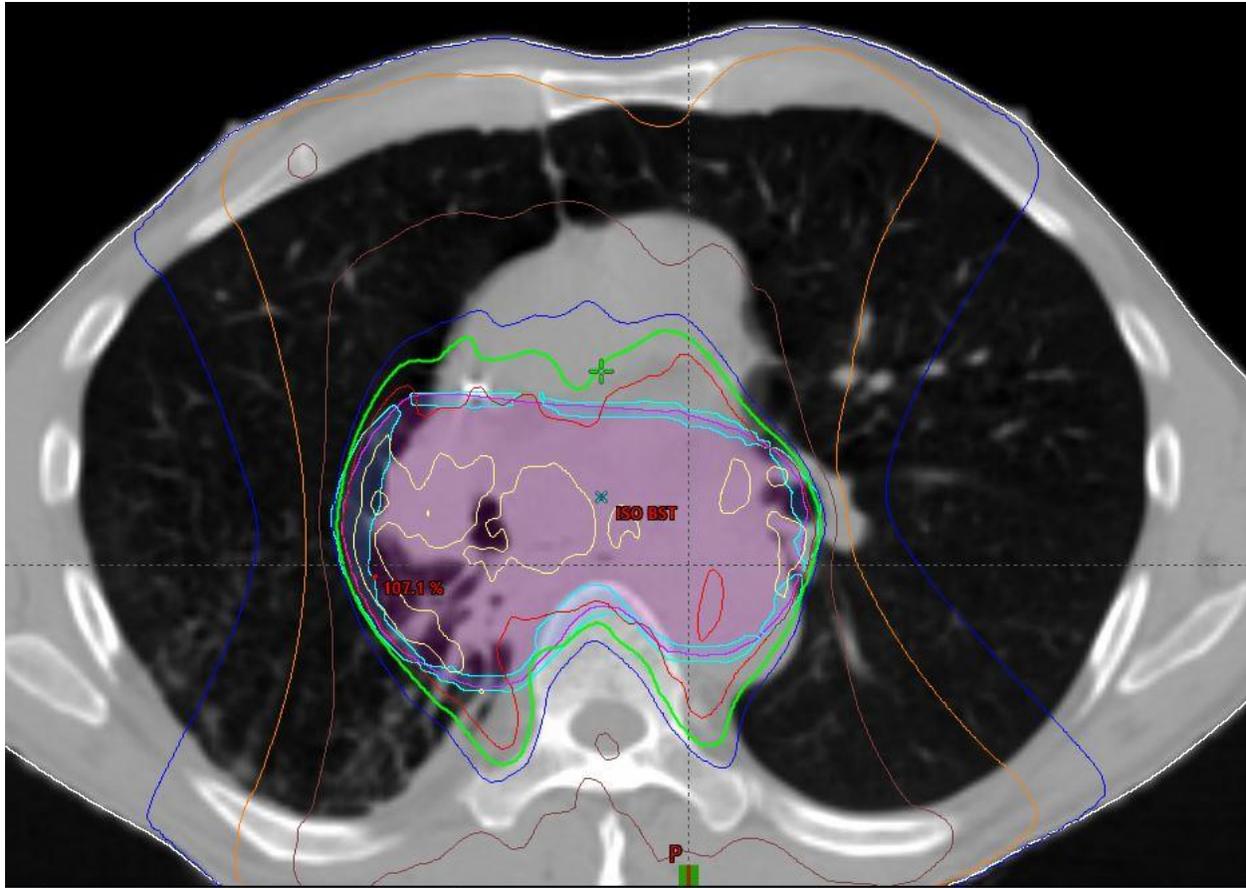
Group	Field ID	Technique	Machine/Energy	MLC	Field Weight	Scale	Gantry Rtn [deg]	Coll Rtn [deg]	Couch Rtn [deg]	Wedge	Field X [cm]	X1 [cm]	X2 [cm]	Field Y [cm]	Y1 [cm]	Y2 [cm]	X [cm]	Y [cm]	Z [cm]	Calculated SSD [cm]	MU	Ref. D [cGy]
I	CBCT	STATIC-I	D-2300CD - 6X		0.000	Varian IEC		0.0	0.0	0.0	15.0	+7.5	+7.5	15.0	+7.5	+7.5	0.00	3.00	1.00	89.5		
I	5CW	ARC-I	D-2300CD - 6X	VMAT	0.924	Varian IEC	181.0 CW 179.0	10.0	0.0	None	14.8	+7.2	+7.5	19.2	+9.8	+9.5	0.00	3.00	1.00	89.7	167	
I	6 CCW	ARC-I	D-2300CD - 6X	VMAT	0.974	Varian IEC	179.0 CCW 181.0	350.0	0.0	None	14.8	+7.5	+7.2	19.2	+9.8	+9.5	0.00	3.00	1.00	89.7	176	
I	7 CW	ARC-I	D-2300CD - 6X	VMAT	0.503	Varian IEC	181.0 CW 179.0	90.0	0.0	None	15.0	+9.5	+5.5	13.9	+7.1	+6.8	0.00	3.00	1.00	89.7	91	
I	RLKV	STATIC-I	D-2300CD - 6X		0.000	Varian IEC	270.0	0.0	0.0	None	15.0	+7.5	+7.5	15.0	+7.5	+7.5	0.00	3.00	1.00	83.4		
I	APKV	STATIC-I	D-2300CD - 6X		0.000	Varian IEC		0.0	0.0	None	15.0	+7.5	+7.5	15.0	+7.5	+7.5	0.00	3.00	1.00	89.5		



Once again I used a beam treating the posterior portion of the arc to control heart dose and extended it more superior because from the axial slices I wanted the optimizer to see that was

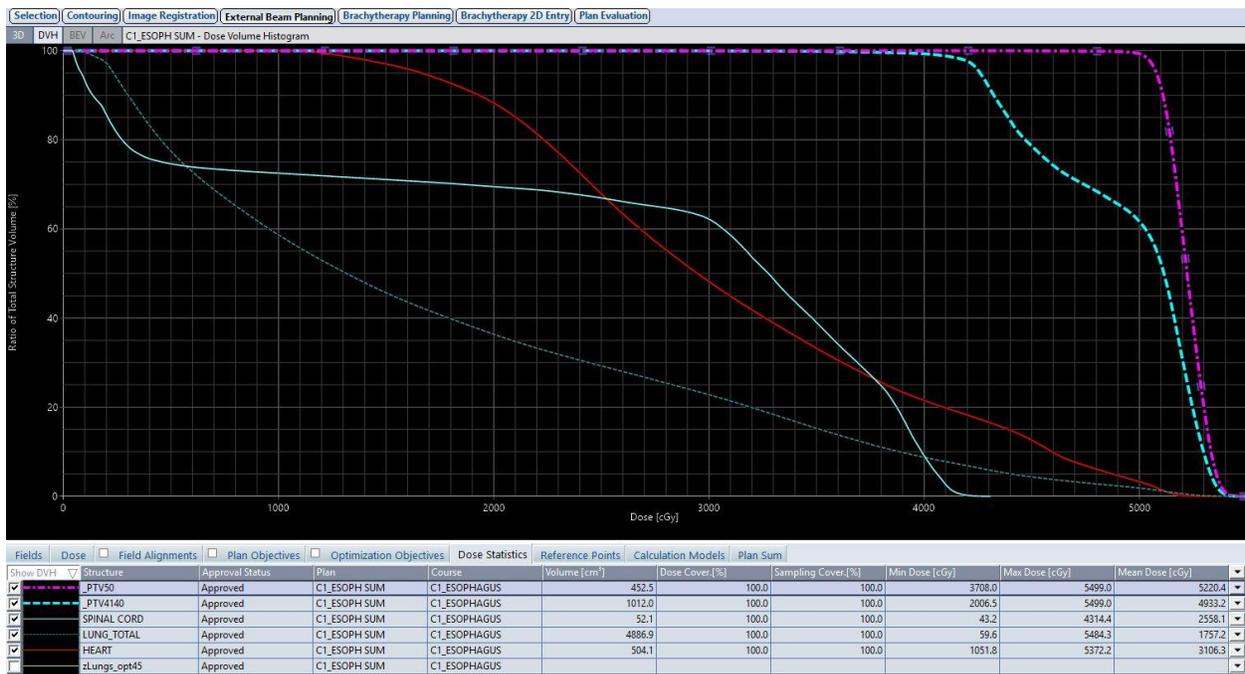
a good option to deliver dose from the posterior. You have to evaluate everything you do with your own computer brain! LOL!

You can see from the next jpeg the PTV\_LUNG BST\_OPT .(the ghost in cyan)



I optimized in much the same manner as the initial, putting a couple of lower objectives below the 95% value as above and doubling the PTV\_upper objective value in level 1.

Below is the composite plan followed by the composite DVH to 5040cGy.



I learned a couple of things from this case that I would like to share:

1. Often times we all go back into the optimizer after we create an isodose line into a structure to lower the hot spot. In the boost plan, I used that technique and it only lowered the hot spot about 1.3%. Because I treated the boost first, I did not do that in the revised initial plan because I did not want the plan to end up over modulated once again. I can get away with that because of the high PTV upper objective.

2. On the initial plan I did a trick I use on other parts of the body to pull in some low isodose curves. I believe this contributed to over modulation as well so I did not use it on the revised initial plan. **Here is the trick you can try:** Let's say upon review of a lung plan, you want to tighten (bring in) the 50% line down to the 20% line. In this instance I convert the 20% to a structure, the 30% to a structure and the 50% to a structure. I then create 2 avoidance structures. In the first one I use the Boolean tool and choose 20%- Subtract 30%. The gap between the 20 and 30 appear. Then I take that avoidance and I do a Boolean where this avoidance Intersects with the bilat Lung. I repeat this with the 30 and 50% line. 30% Subtract 50%, then this structure Boolean Intersect with the bilat lung. I use these avoidances to help pull in lung dose and achieve the V5,10 and 20.

I hope these tips and tricks help. Just remember... the optimizer is only as good as the driver. It needs directions and steering!

Mel