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Going Live with CivaSheet: Steps for Treatment Planning and Commissioning

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Disclosures

- None




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Objectives

- Documentation
- TPS Commissioning
- Clinical tips and tricks




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Documentation

Prescription



 CivaSheet Physician's Order and Prescription	
Patient Name (Last, First)	Acuros, Test
MIDN #	96704210
D.O.B.	
Attending	Lorraine Portelance, MD
Procedure Type:	<input type="checkbox"/> HDR <input checked="" type="checkbox"/> LDR
Treatment Site:	
Approximate Tumor Bed Dimensions:	<input type="text"/> cm × <input type="text"/> cm
Radioisotope:	Pd-103
Prescribed dose for this implant:	<input type="text"/> Gy
Prescription Depth:	<input type="text"/> mm
Number of planned implants:	<input type="text"/>
Date of insertion:	<input type="text"/>
Post-implant:	Please perform post-implant CT imaging and document.
Comments:	<input type="text"/>
Comments:	<input type="text"/>
Comments:	<input type="text"/>


Activity Calculation



CivaSheet Activity Calculation
SCC/University of Miami

Patient:	<input type="text"/>	Physician:	Dr. L. Portelance
UMMCR:	<input type="text"/>		
DOB:	<input type="text"/>		
Dose (Gy):	<input type="text"/> Gy		
Date of Implant:	<input type="text"/>		
Prescription Depth:	<input type="text"/> mm		max depth = 8 mm
CivaSheet Size:	<input type="text"/>		
Activity Per Source (U):	<input type="text"/> U/Dot	(0 - 5 U)	From Cohen, Brachytherapy 16 (2017), 1257-1264
Total Activity (U):	<input type="text"/> U	<input type="text"/> mCi	
Physicist:	<input type="text"/>		
Date:	<input type="text"/>		

Written Directive



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CIVA-SHEET BRACHYTHERAPY TREATMENT RECORD

Patient Name: _____ Date: _____
 Physician: _____ Radiologist: _____
 Patient Identification Method (check box next to method used): ICD-9 First Photo BrachySeedBarcode

PRESCRIPTION

Site: _____

Dose: _____ Gy to _____

Plan: Number of Sources: _____ Activity/Source: _____ Total Activity: _____ U

Physician Signature: _____ Date: _____ Time: _____
 Physicist Signature: _____ Date: _____ Time: _____

PLAN SUMMARY


Number of Sources Implanted: _____ Number of Sources Recommended: _____
 Total Activity Implanted: _____ Expected Reference Dose: _____ Gy
 Exposure Rate at 1 m: _____ mSv/h [mSv/h = activity (MBq) x source-to-point distance (cm) / (4π × distance²)]

Physician Signature: _____ Date: _____ Time: _____
 Physicist Signature: _____ Date: _____ Time: _____

POST-IMPLANT RADIATION SURVEY (I.R.)


Exposure Rate: _____ mSv/h
 Physicist Signature: _____ Date: _____ Time: _____

Form No. 104-0000-001 (02/2017)


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Written Directive

		Number of CivaDots in a direction																			
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Number of CivaDots in direction	2	200.0	32.8	34.2	35.1	35.8	36.2	36.6	36.8	37.1	37.2	37.4	37.5	37.6	37.7	37.8	37.9	37.9	38.0	38.0	
	3	32.8	355.6	35.6	37.5	38.1	38.6	39.0	39.3	39.6	39.8	39.9	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.7	
	4	34.2	36.6	372.8	38.6	39.2	39.6	40.0	40.3	40.5	40.7	40.9	41.0	41.2	41.3	41.4	41.5	41.6	41.6	41.7	
	5	35.1	37.5	38.6	395.0	39.8	40.2	40.5	40.8	41.0	41.2	41.3	41.5	41.6	41.7	41.8	41.9	42.0	42.1	42.1	
	6	35.8	38.1	39.2	39.8	403.0	40.6	40.9	41.1	41.3	41.5	41.6	41.7	41.9	42.0	42.1	42.1	42.2	42.3	42.3	
	7	36.2	38.6	39.6	40.2	40.6	409.0	41.1	41.3	41.5	41.7	41.8	41.9	42.0	42.1	42.2	42.3	42.3	42.4	42.5	
	8	36.6	39.0	40.0	40.5	40.9	41.1	413.0	41.5	41.7	41.8	41.9	42.0	42.1	42.2	42.3	42.4	42.4	42.5	42.6	
	9	36.8	39.3	40.3	40.8	41.1	41.3	41.5	417.0	41.8	41.9	42.0	42.1	42.2	42.3	42.4	42.5	42.5	42.6	42.6	
	10	37.1	39.6	40.5	41.0	41.3	41.5	41.7	418	421.0	42.1	42.2	42.3	42.4	42.5	42.5	42.6	42.6	42.7	42.7	
	11	37.2	39.8	40.7	41.2	41.5	41.7	41.8	419	421.0	42.2	42.3	42.4	42.5	42.5	42.6	42.6	42.7	42.7	42.7	
	12	37.4	39.9	40.9	41.3	41.6	41.8	41.9	42.0	42.2	42.2	423.0	42.4	42.5	42.5	42.6	42.6	42.7	42.7	42.8	
	13	37.5	40.1	41.0	41.5	41.7	41.9	42.0	42.1	42.2	42.3	424	426.0	42.5	42.6	42.6	42.7	42.7	42.8	42.8	
	14	37.6	40.2	41.2	41.6	41.9	42.0	42.1	42.2	42.3	42.4	42.5	426.0	42.6	42.7	42.7	42.8	42.8	42.9	42.9	
	15	37.7	40.3	41.3	41.7	42.0	42.1	42.2	42.3	42.4	42.5	42.5	426	427.0	42.7	42.8	42.8	42.9	42.9	42.9	
	16	37.8	40.4	41.4	41.8	42.1	42.2	42.3	42.4	42.5	42.5	426	427	427	428.0	42.9	42.9	42.9	43.0	43.0	
	17	37.9	40.5	41.5	41.9	42.1	42.2	42.4	42.5	42.5	42.6	42.7	42.7	42.8	42.8	429.0	42.9	42.9	43.0	43.0	
	18	37.9	40.6	41.6	42.0	42.2	42.3	42.4	42.5	42.6	42.6	42.7	42.7	42.8	42.8	42.9	42.9	429.0	43.0	43.0	
	19	38.0	40.7	41.6	42.1	42.3	42.4	42.5	42.6	42.6	42.7	42.7	42.8	42.8	42.9	42.9	42.9	43.0	430.0	43.0	
	20	38.0	40.7	41.7	42.1	42.3	42.5	42.6	42.6	42.7	42.7	42.8	42.8	42.9	42.9	43.0	43.0	43.0	43.0	430.0	


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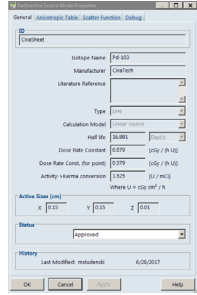
Cohen, G. et al. Intraoperative implantation of a mesh of directional palladium sources (CivaSheet). Dosimetry verification, clinical commissioning, dose specification and preliminary experience. Brachytherapy (2017).

TPS Commissioning

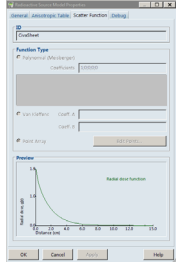
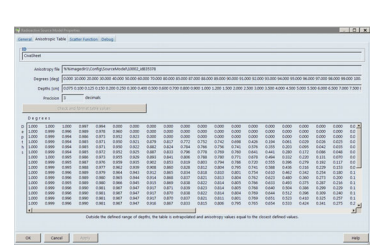

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TPS Commissioning

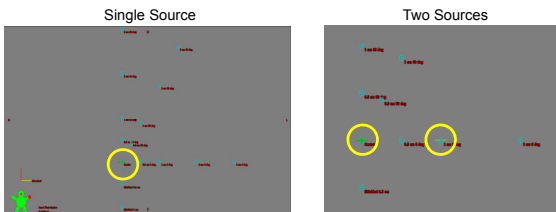
- Varian BrachyVision
- TG-43 source modeling
- Source parameters provided by the vendor
 - Dose rate constant
 - Radial dose function
 - Anisotropy function
- All data have been calculated using MC



TPS Commissioning



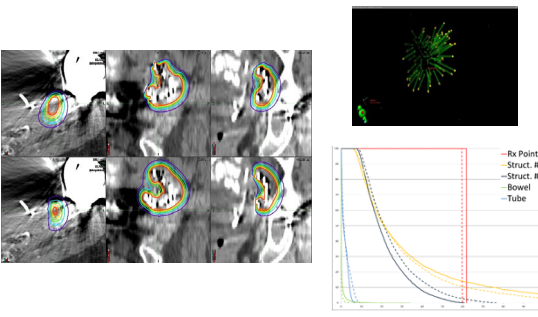
TPS Commissioning



TPS Commissioning

Vendor

Miami



The slide displays a comparison of TPS commissioning between a Vendor and Miami. On the left, two columns of axial CT scans show target and organ-at-risk contours. On the right, a 3D visualization shows a green tree-like structure representing the target. Below this is a graph with a legend: Rx Point (red dashed line), Struct. #1 (blue line), Struct. #2 (yellow line), Bowel (green line), and Tube (black line). The graph plots a metric (likely dose) against distance (cm), showing the dose profiles for each structure and the Rx point.

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Tips & Tricks

Case Studies

- **9 scheduled cases, 6 implanted**
- 1. Leiomyosarcoma of the retroperitoneum
 - Marginally resected and then underwent radiation and chemotherapy
 - Follow-up surgery to inspect possible residual disease of the S1 nerve root
- 2. Sarcoma at the bifurcation of the aorta
 - Excessive tumor growth
- 3. Left buttock sarcoma
 - Tiny, curved tumor bed
 - Surgeon's first case

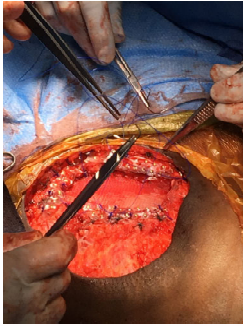
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Case Study #2

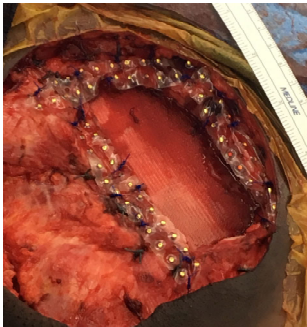
- 19 y/o female
- Malignant phylloides tumor of right breast
- Partial mastectomy followed up by radiation and chemotherapy
- Tumor recurred in right chestwall
- Plan was to resect tumor and chest wall and place the CivaSheet around the resected chestwall
- 55 Gy to 5 mm

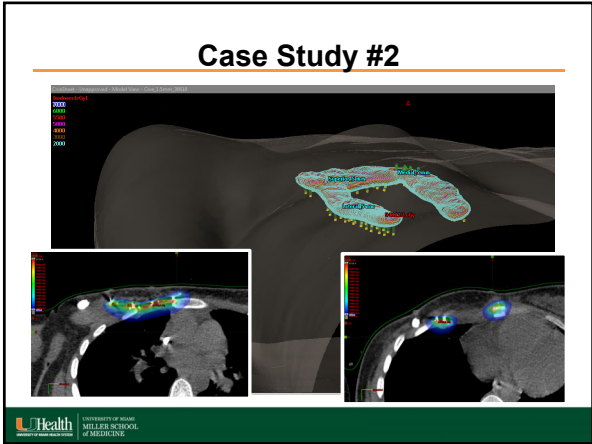


Case Study #2



Case Study #2





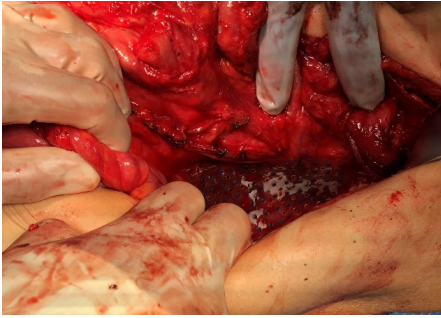
Case Study #3

- 44 y/o female
- Retroperitoneal liposarcoma
- Resected in 2008 followed by radiation therapy
- Recurrence in 2017, again resected and radiation therapy
- Tumor recurred again near left psoas muscle
- Plan was to resect tumor with partial colectomy and place the CivaSheet in tumor bed
- 40 Gy to 5 mm

The University of Miami Miller School of Medicine logo is visible in the bottom left corner.

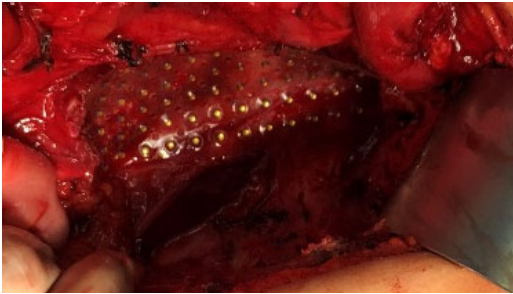


Case Study #3



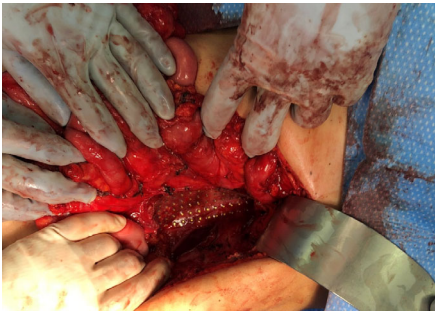
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Case Study #3



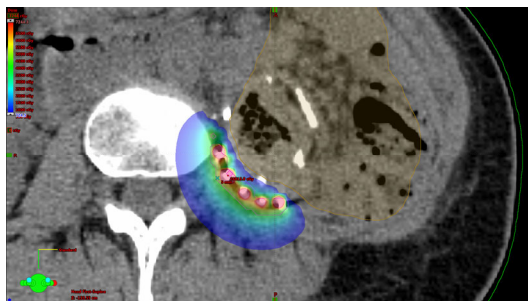
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Case Study #3



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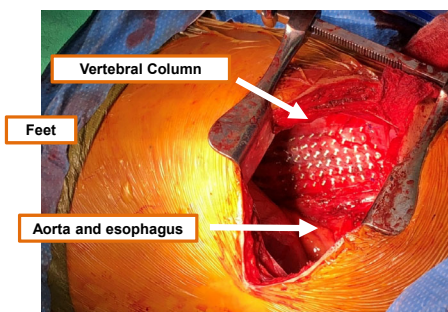
Case Study #3



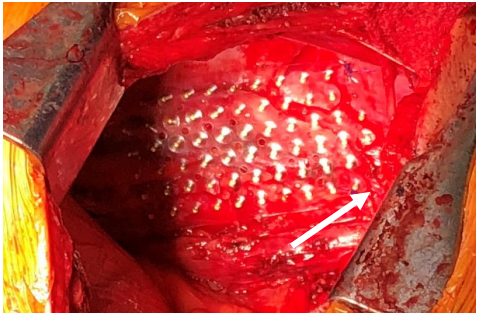
Case Study #4

- 64 y/o male
- Mediastinal liposarcoma
- Radiation therapy (30 Gy in 5 fx) to the mediastinum followed by surgery
- CivaSheet to be placed in tumor bed
- 45 Gy to 5 mm

Case Study #4

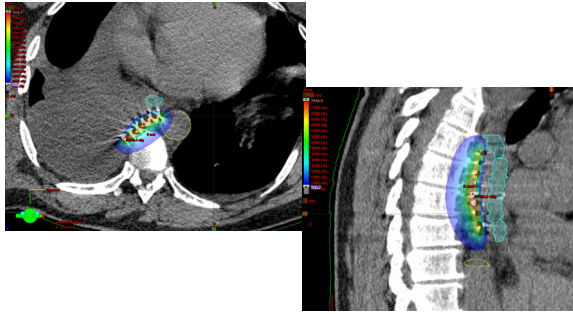


Case Study #4



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Case Study #4



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Case Study #5

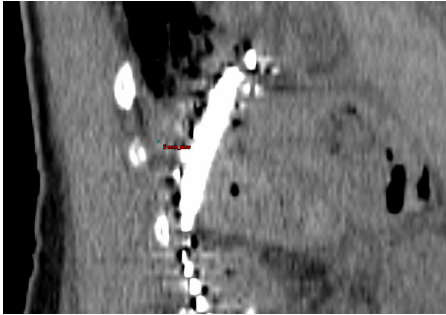
- Patient previously treated with CivaSheet
- Retroperitoneal liposarcoma near left psoas
- Tumor recurred superior to the previous CivaSheet
- 45 Gy to 5 mm

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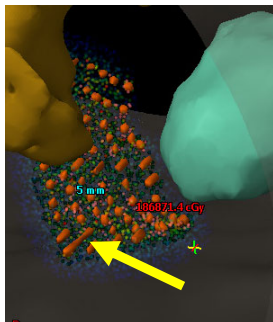
Case Study #5



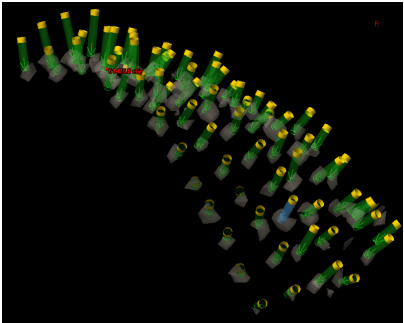
Case Study #5



Case Study #5



Case Study #5



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CivaSheet

- Safely implemented new technology
- Careful commissioning
- Policies and procedures in place
- Take pictures!
- Threshold the sheet for post implant dosimetry

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Thank you!

- Physicians – Drs. Portelance and Yechieli
- CivaTech Support
 - Ren Babcock

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Questions?