Ein Vergleich von Helax und OTP und Bewertung mit XVMC

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Übersicht

- Inverse Planung der IMRT mit Helax und OTP (Nukletron)
- Probleme bei der IMRT-Planung
- DVHs in OTP und XVMC
- Ausblick OMP

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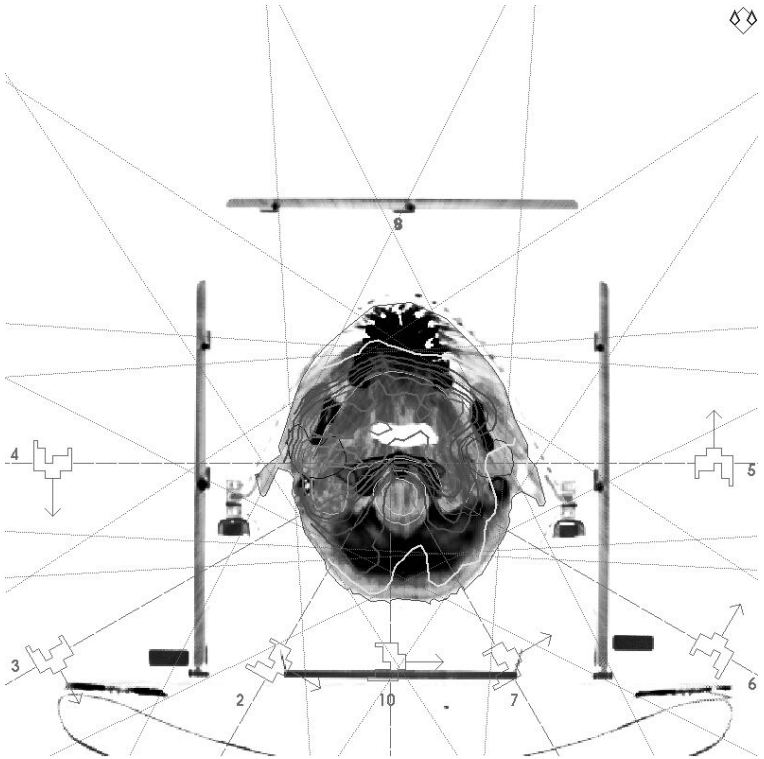
IMRT Standard HNO

- 7 Felder isotrop dorsal: 90°, 120°, 150°, 180°, 210°, 240°, 270°
- Risikoorgan Rückenmark: zur Optimierung ERM mit 0,5 cm Margin
- Risikoorgan Parotis
- PTV, EPTV



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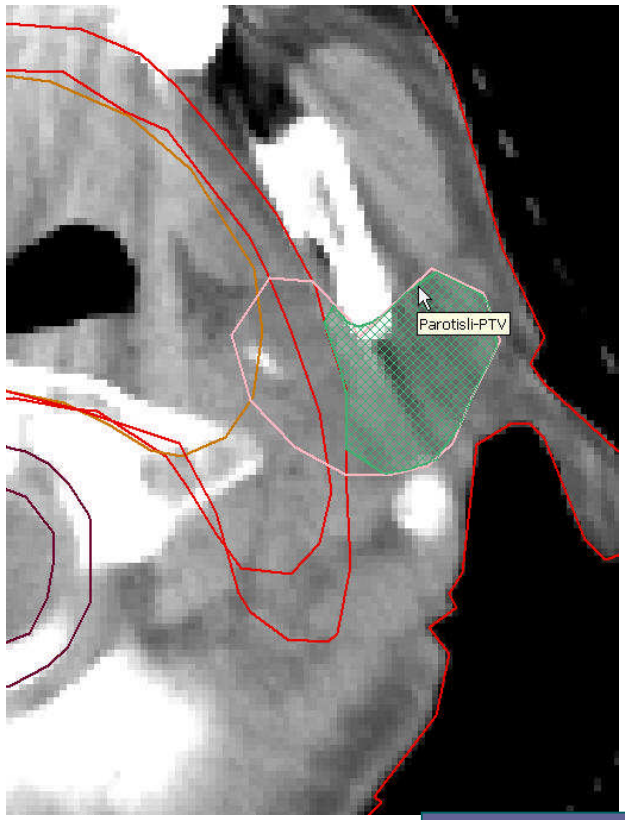
OTP: Differenzvolumen

Durch die Erzeugung von Differenzvolumina kann die Optimierung besser gesteuert werden.



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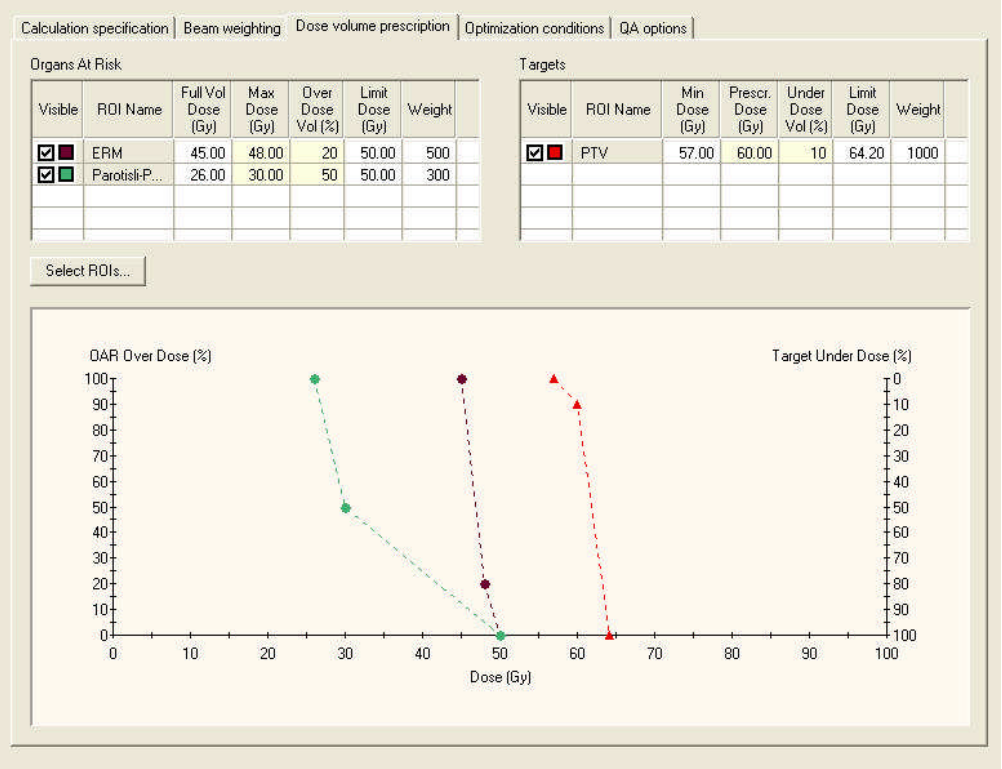
Constraints: Helax – OTP

	<<					>>
Label	Outline	PTV	LAG re.	Boost1bis	Boost2bis7	EPTV50
Type	OAR	Tumour				Tumour
Con DV	<2>					<2>
Weight	0.500	1.000	1.000	1.000	1.000	0.900

Obj fn:
Wgt feas



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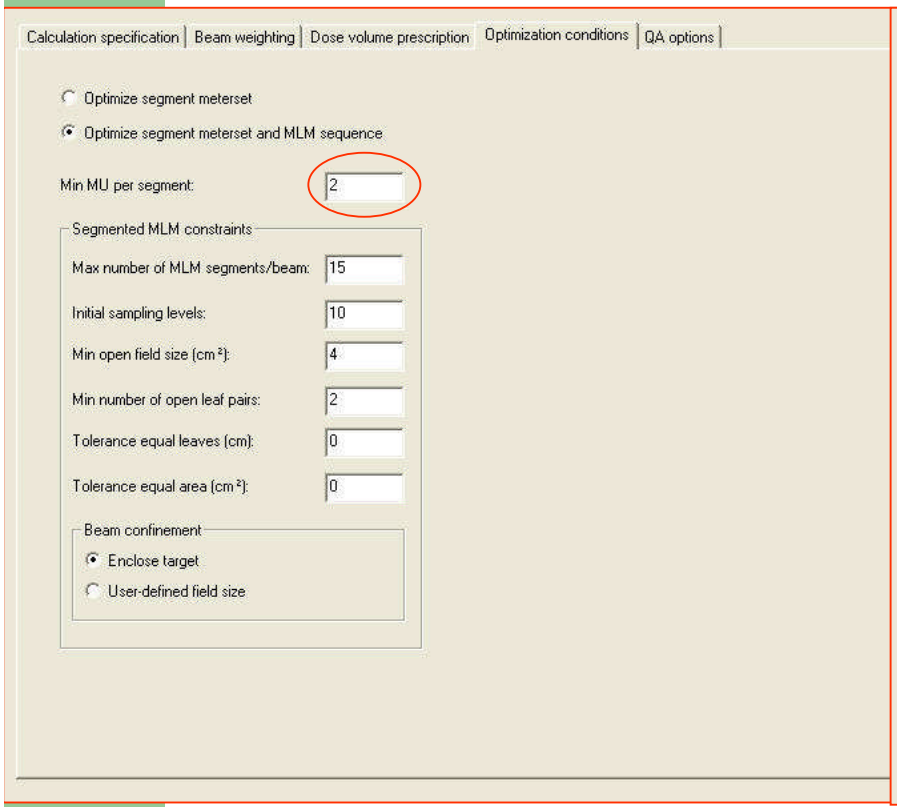
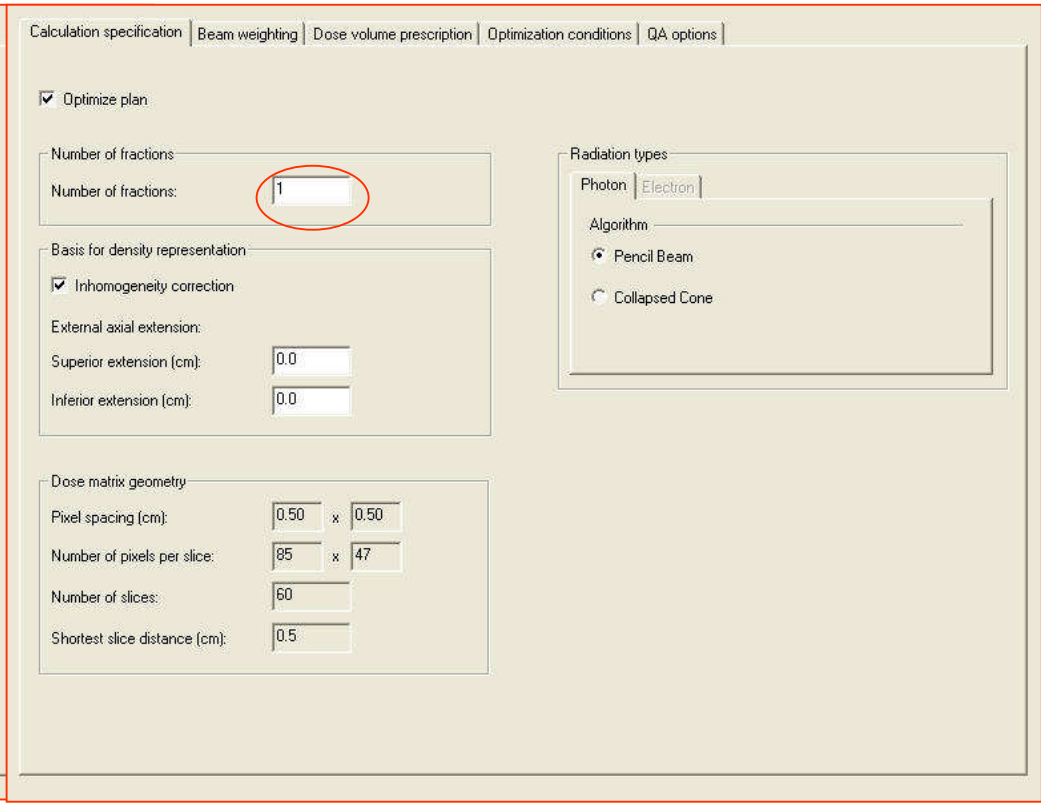
Segmentierungsvorgaben





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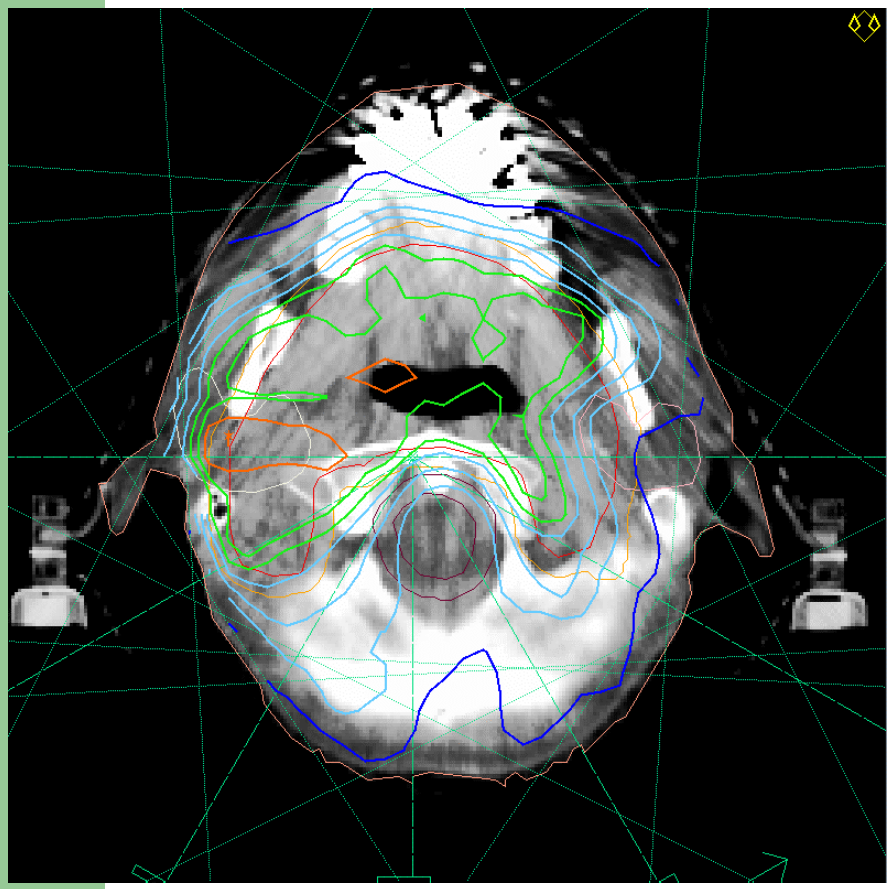
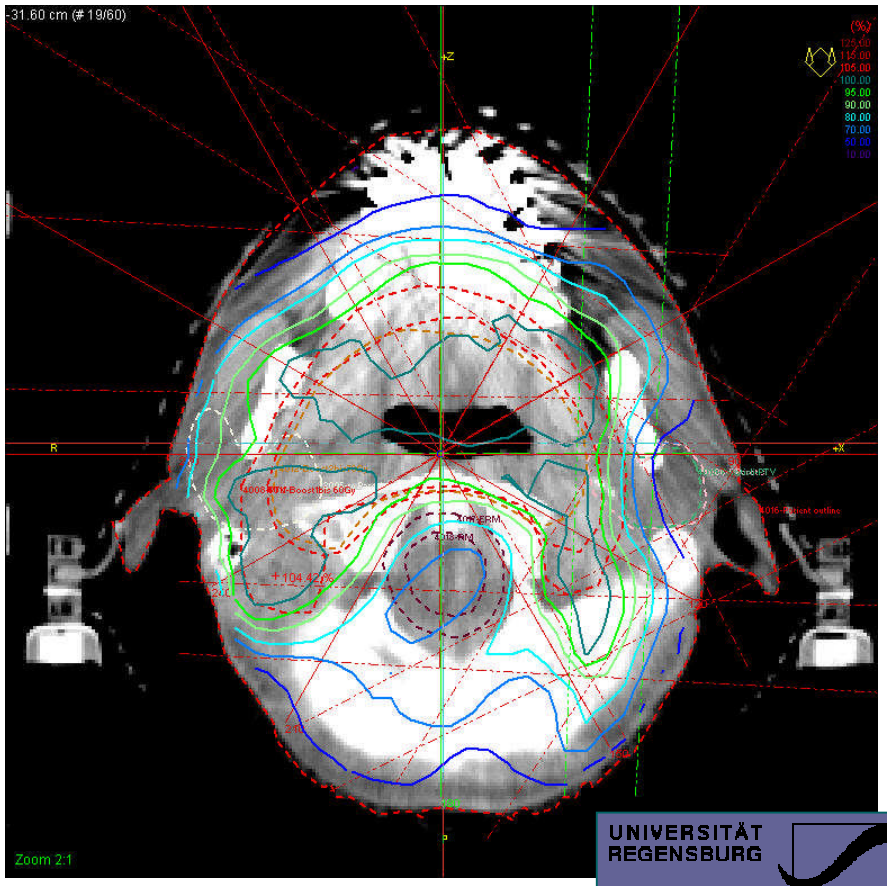
Isodosen: Helax - OTP





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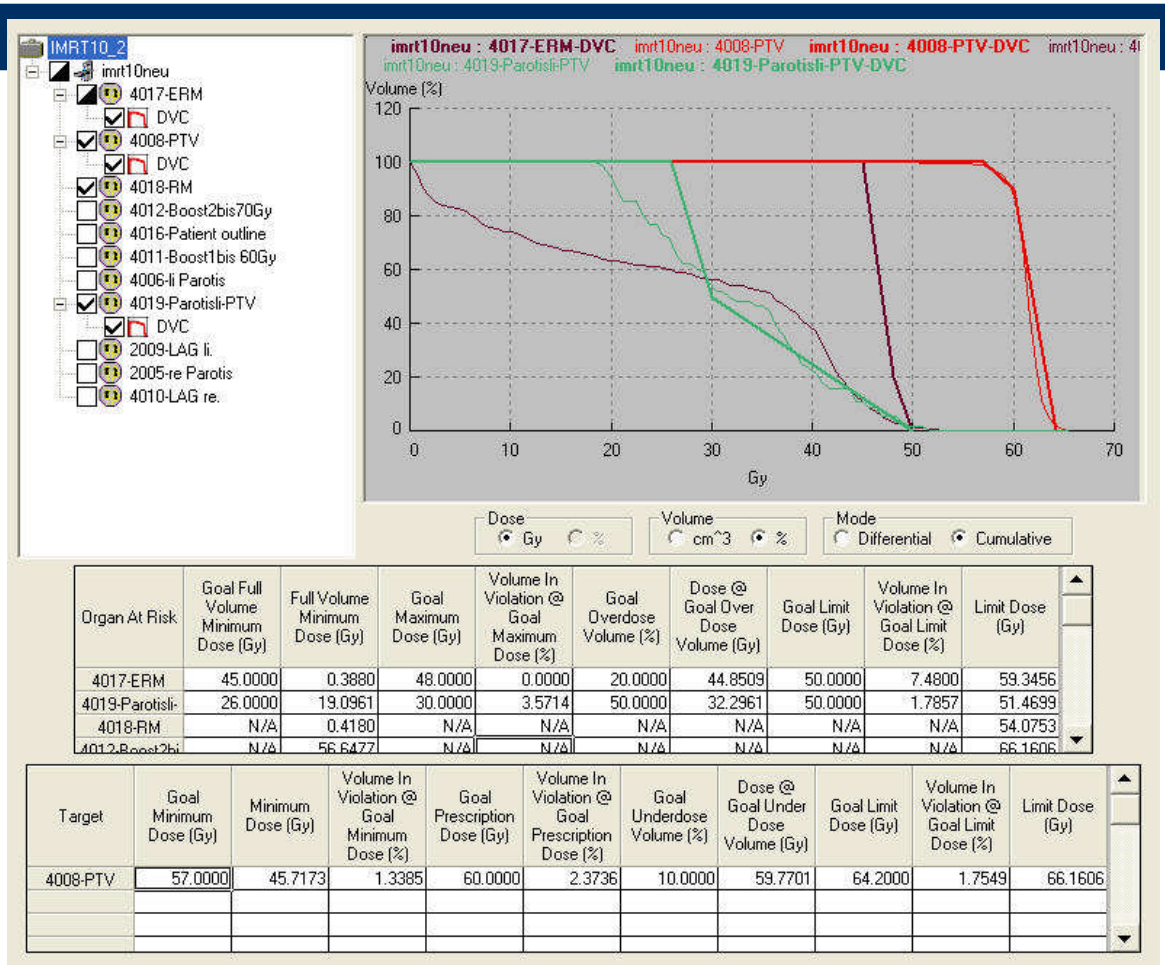
DVH - OTP



Organ At Risk	Goal Full Volume Minimum Dose (Gy)	Full Volume Minimum Dose (Gy)	Goal Maximum Dose (Gy)	Volume In Violation @ Goal Maximum Dose (%)	Goal Overdose Volume (%)	Dose @ Goal Over Dose Volume (Gy)	Goal Limit Dose (Gy)	Volume In Violation @ Goal Limit Dose (%)	Limit Dose (Gy)
4017-ERM	45.0000	0.3880	48.0000	0.0000	20.0000	44.8509	50.0000	7.4800	59.3456
4019-Parotisli-	26.0000	19.0961	30.0000	3.5714	50.0000	32.2961	50.0000	1.7857	51.4699
4018-RM	N/A	0.4180	N/A	N/A	N/A	N/A	N/A	N/A	54.0753
4012-Boost2bi	N/A	56.6477	N/A	N/A	N/A	N/A	N/A	N/A	66.1606

Target	Goal Minimum Dose (Gy)	Minimum Dose (Gy)	Volume In Violation @ Goal Minimum Dose (%)	Goal Prescription Dose (Gy)	Volume In Violation @ Goal Prescription Dose (%)	Goal Underdose Volume (%)	Dose @ Goal Under Dose Volume (Gy)	Goal Limit Dose (Gy)	Volume In Violation @ Goal Limit Dose (%)	Limit Dose (Gy)
4008-PTV	57.0000	45.7173	1.3385	60.0000	2.3736	10.0000	59.7701	64.2000	1.7549	66.1606

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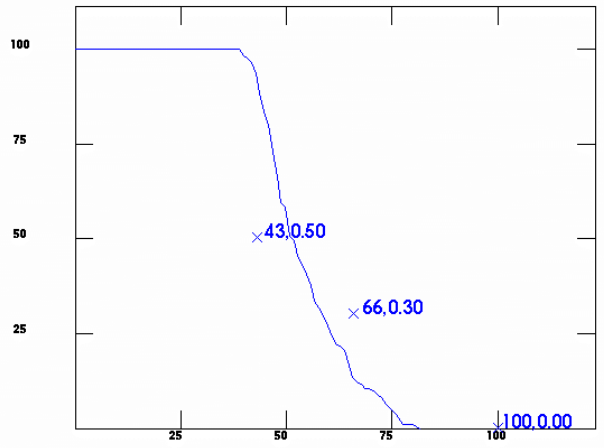
DVH – Helax: li. Parotis, PTV

DVH–VOI id 6 li Parotis

Volume (ccm): 10.

Calc. pnts 101 / 101

% (Vol)



Dose

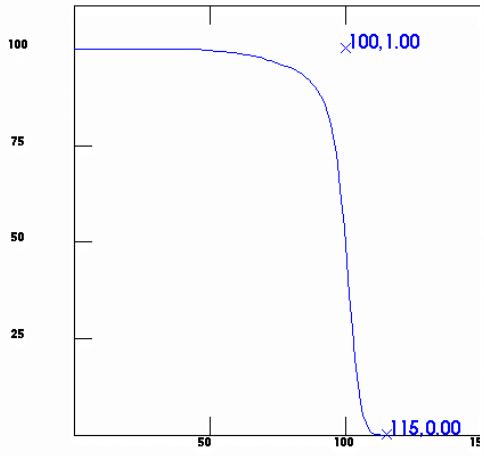
Min 38.8
Max 80.9
Median 51.2
Mean 54.2
Stand.dev 10.0

DVH–VOI id 13 EPTV50

Volume (ccm): 611.

Calc. pnts 5027 / 5027

% (Vol)



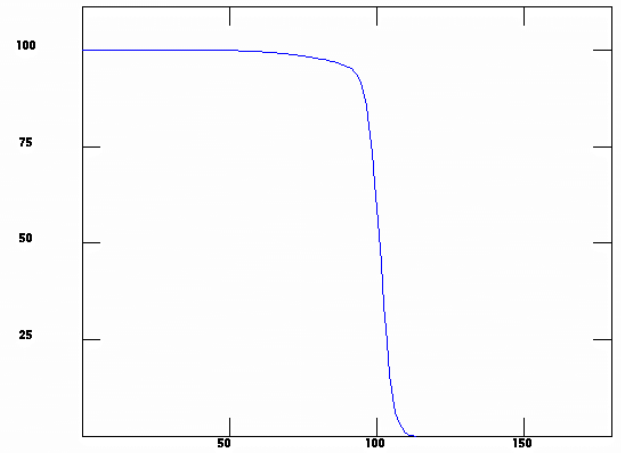
Min 45.0
Max 112.9
Median 99.8
Mean 97.8
Stand.dev 8.8

DVH–VOI id 8 PTV

Volume (ccm): 405.

Calc. pnts 3373 / 3373

% (Vol)



Dose l

Min 50.2
Max 112.9
Median 100.9
Mean 100.0
Stand.dev 6.3

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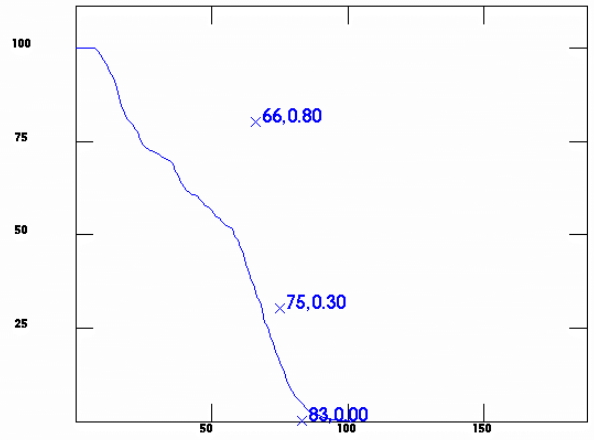
DVH – Helax: RM, ERM

DVH–VOI id 17 ERM

Volume (ccm): 141.

Calc. pnts 1152 / 1152

% (Vol)



Dose level

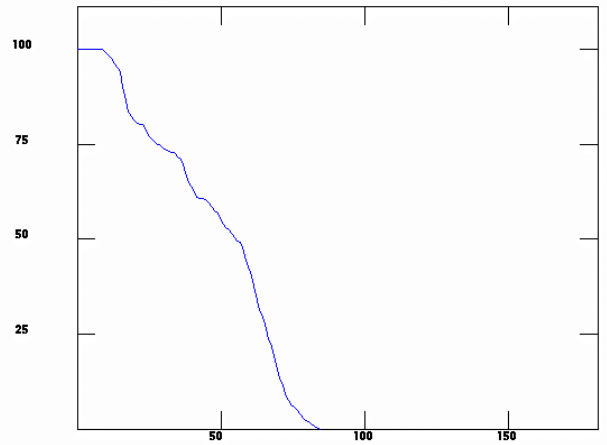
Min 6.6
Max 100.8
Median 58.5
Mean 50.2
Stand.dev 24.5

DVH–VOI id 18 RM

Volume (ccm): 55.

Calc. pnts 467 / 467

% (Vol)



Dose level

Min 9.1
Max 83.7
Median 55.0
Mean 48.4
Stand.dev 21.4

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Probleme bei der IMRT-Planung

- OTP: keine Optimierung, wenn PTV über die Außenkontur hinausgeht
- OTP: manuelle Nacharbeitung nicht möglich!
- Helax: manuelle Nachbesserung immer notwending

OTP

Tip!	An optimized plan is locked for major changes in BM, so it's a good idea to save a copy of the plan made in BM with Save As before calculating so that you can modify the original plan if needed.

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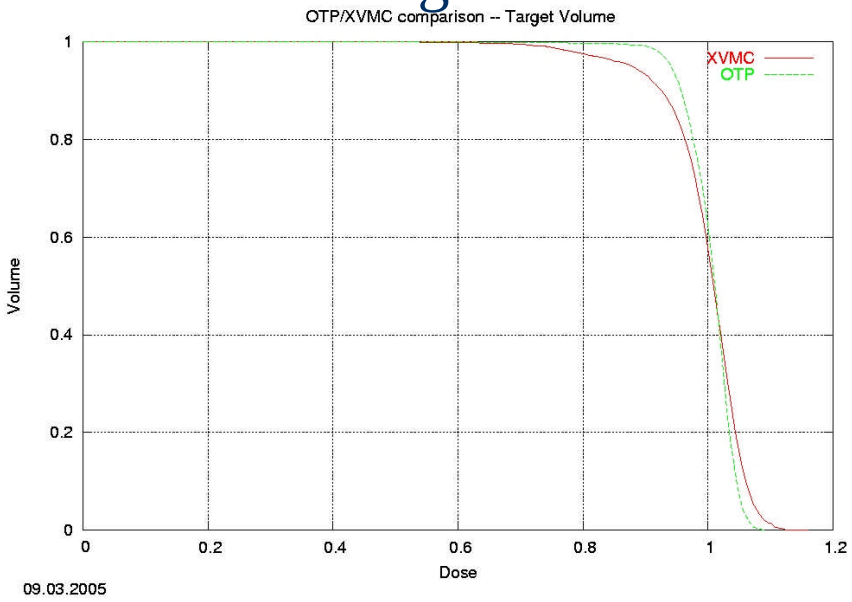
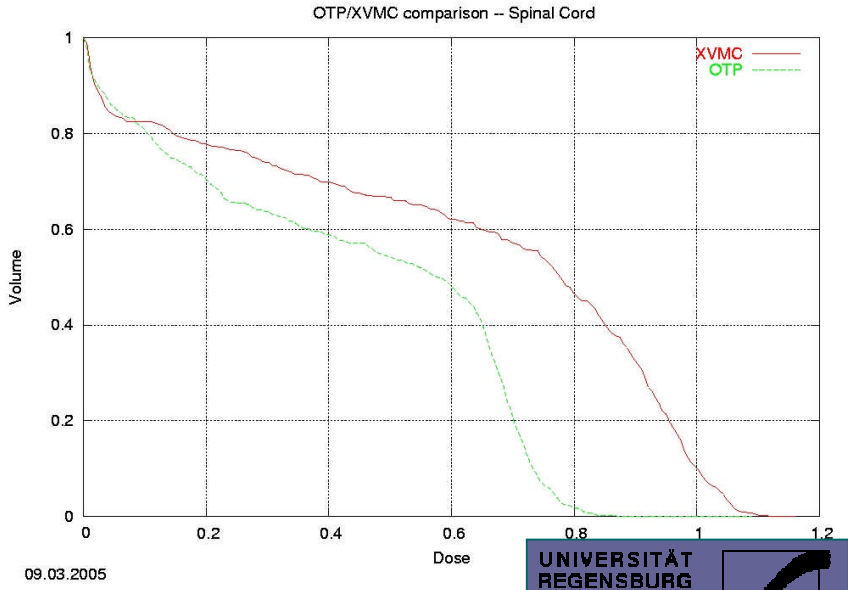
DVH PTV und RM

- OTP mit Pencil Beam gerechnet.
- XVMC (Monte Carlo Code!) berücksichtigt mehr Lateralstreuung





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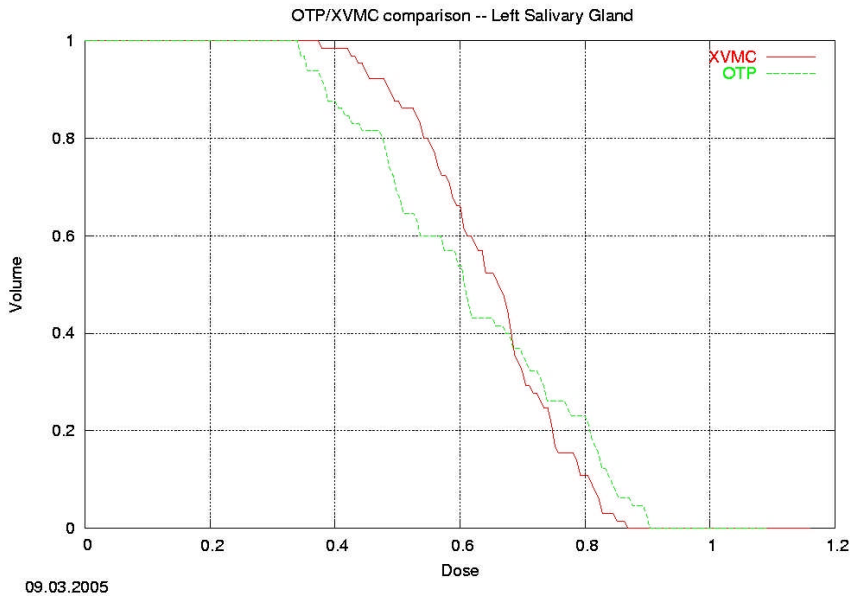
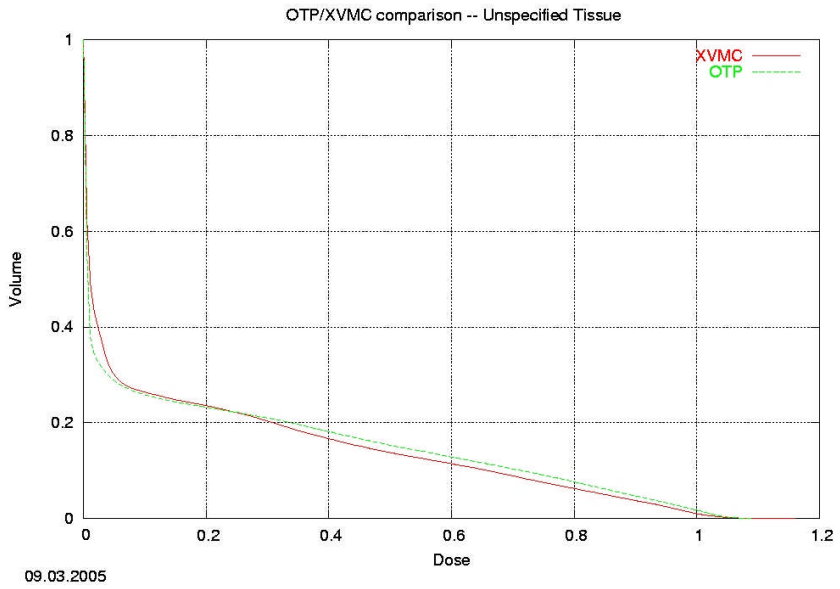
DVH Parotis und Unspecified Tissue





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Ausblick: OMP (Oncentra Master Plan) 1.4

- Spezielles IMRT-Modul (Ray Search)
- Drei Planungsschritte:
  - Optimierung
  - Segmentierung
  - Final Dose Calculation
- Verschiedene Algorithmen für Optimierung und Final Dose Calculation möglich

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