

Treatment & Time Management in MRIdan

Ina Katerina Nilo, Deputy Chief Therapist University Hospital Zürich, CH

Francesca Belosi

Colin Shelton

All MRIdian RTTs

Why Do we Record Time?

- Since 2018, over 400 patients have been treated on MRIdian
- The aim of this study is to keep track of how long each step takes so we can optimize the procedure



How we Record the Time

Each step is recorded by the therapist during the treatment:

- Excel sheet
- **3 Categories:**

1. Adaptive
2. Adaptive with visual help
3. Non- Adaptive



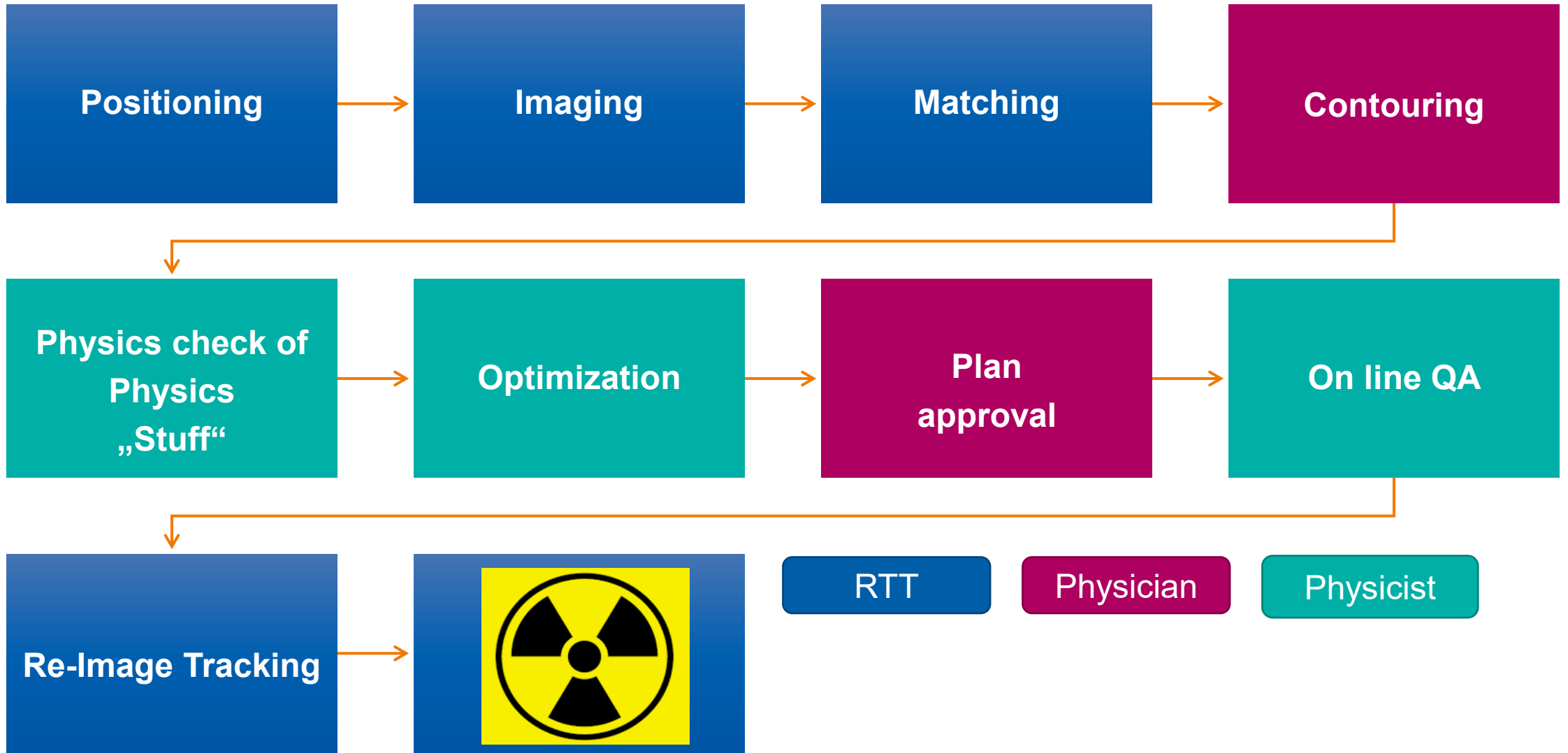
Data Explanation

- Data from 400 patients that were treated since 2018.
- The data was broken down in 2 categories:
 - Before 2020
 - After 2020
- Total treatment time counts from patient positioning until they are taken off the couch

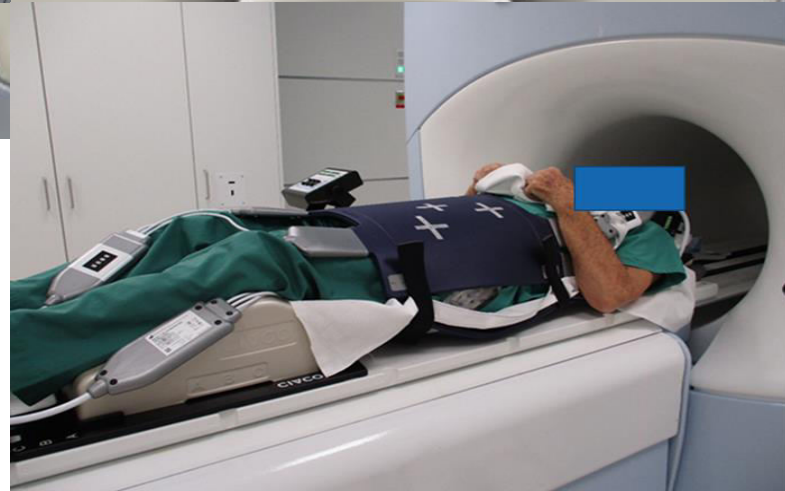
- Adaptive RT is scheduled for 70 min
- Non Adaptive RT is scheduled for 30 min

Total adaption
Time 65 min

Adaptive Workflow



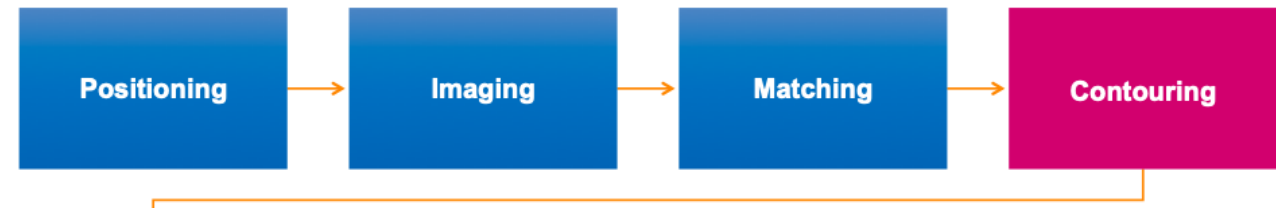
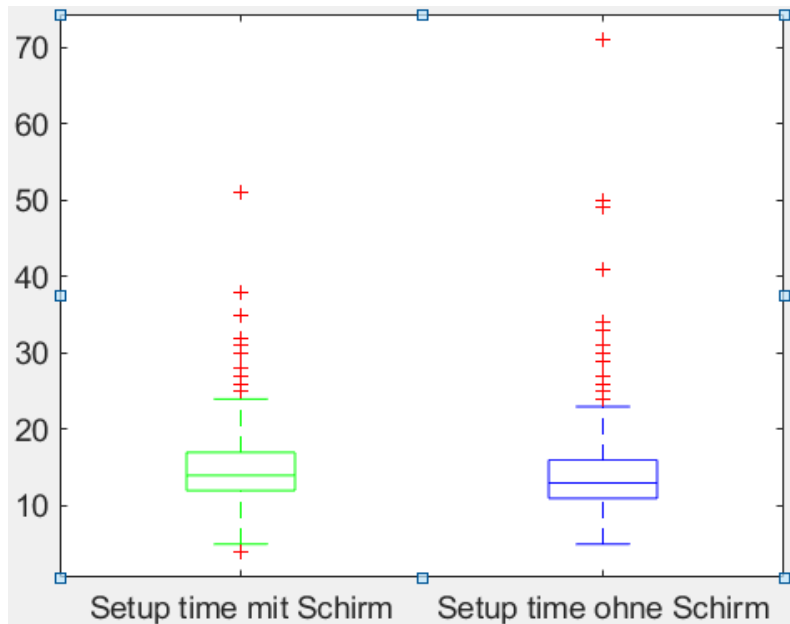
Positioning in MRIdian



Setup Time: *Patient on the Table – Edit Contours*

	Min [min]	Max [min]	Median [min]	Outliers	Nr. Fr.
With Visual [ab 2020]	4	51	14	6%	339
Without [ab 2020]	5	71	13	4%	597
Before 2020	7	42	15	6%	345

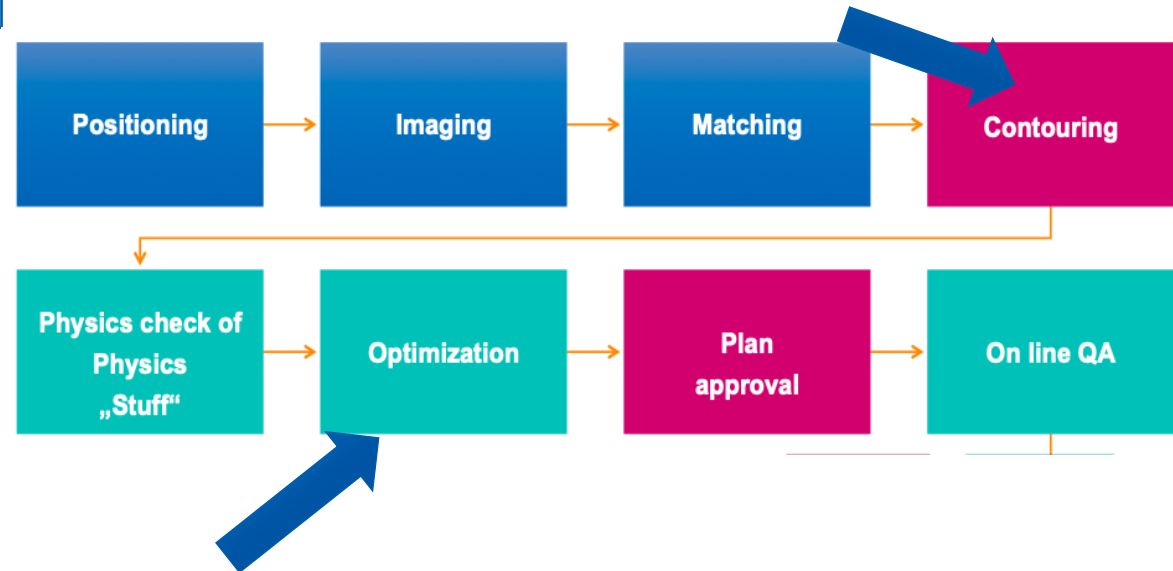
- When we used the Visual Aid, it did not change the length of treatment
- Setup time is about the same since 2020.



Contouring Time: *Edit Contours – Start Optimization*

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Before 2020	2	37	11	2%	339
After 2020	1	49	10	1.6%	933
All	1	49	11	1.8%	1272

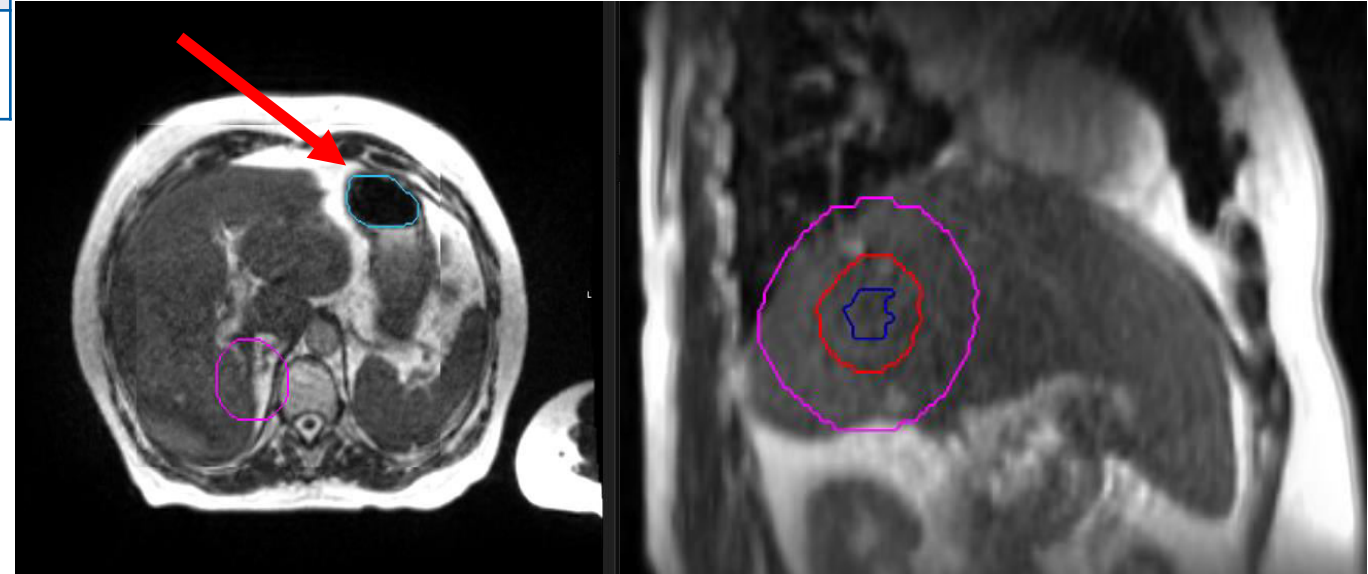
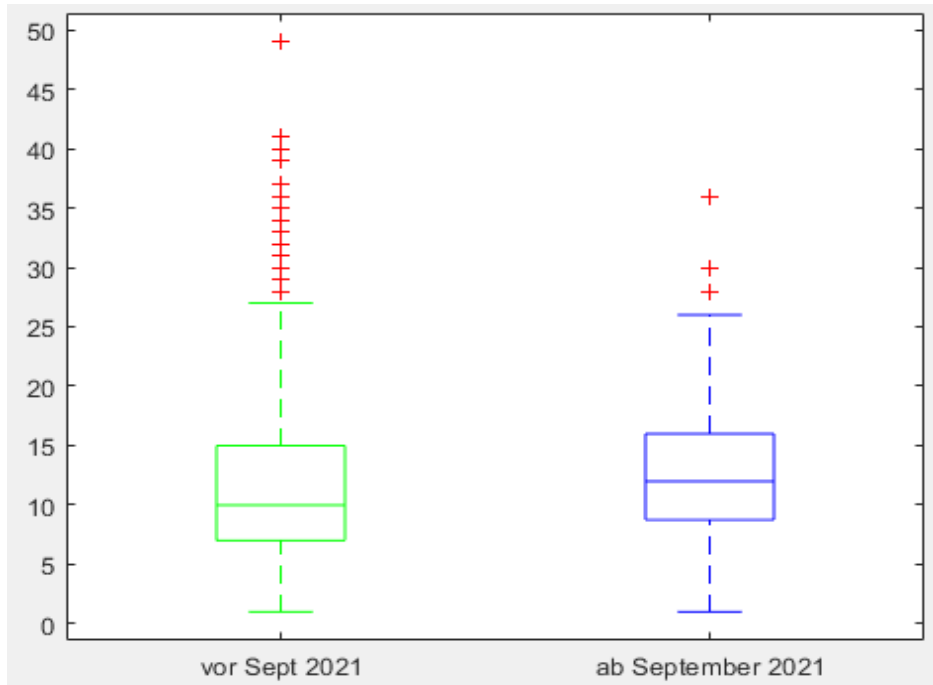
- Contouring time is stable over the years



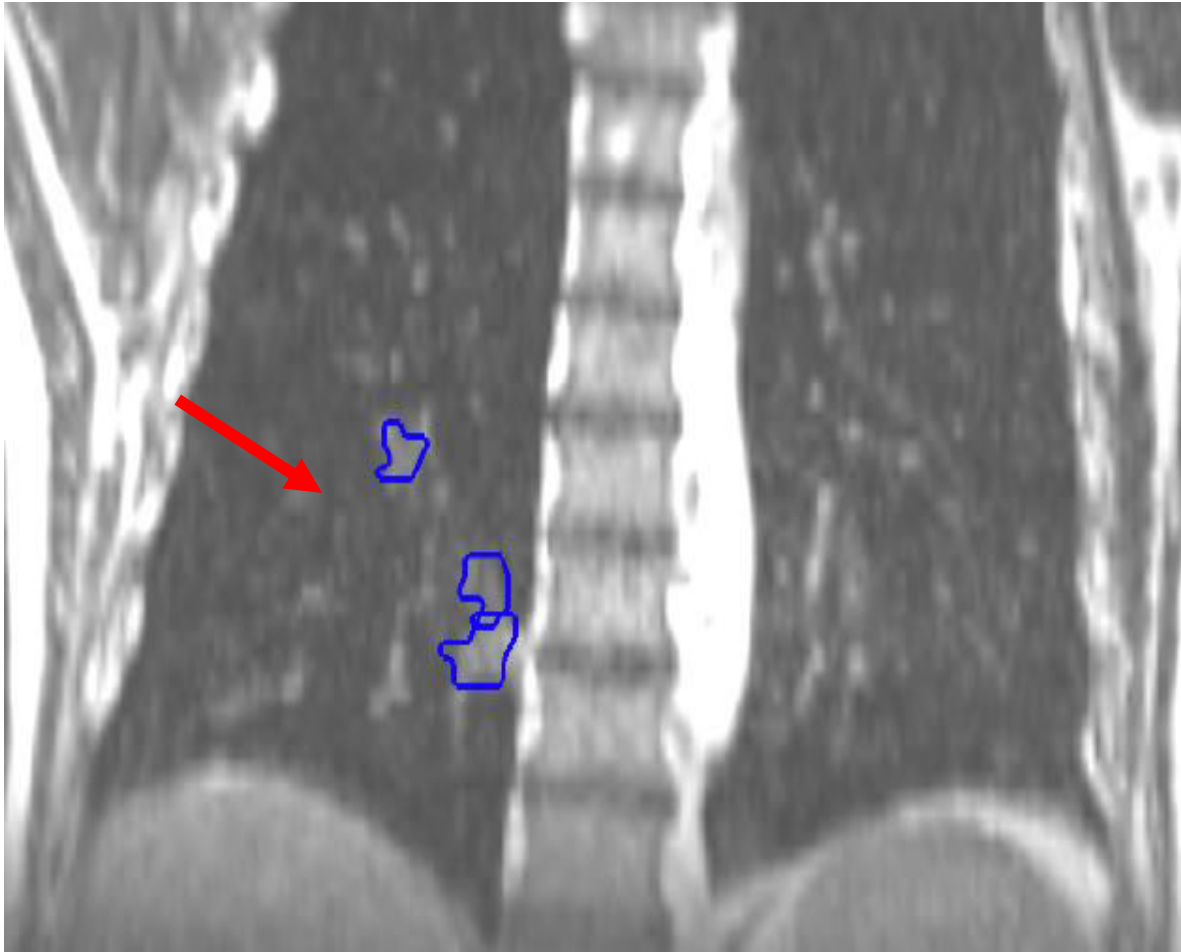
Contouring Time: *Edit Contours* – *Start Optimization*

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Before Sept 2021	1	49	10	2%	971
After Sept 2021	1	36	12	1.3%	301

After September 2021 we applied rules for contouring air



1. Why?



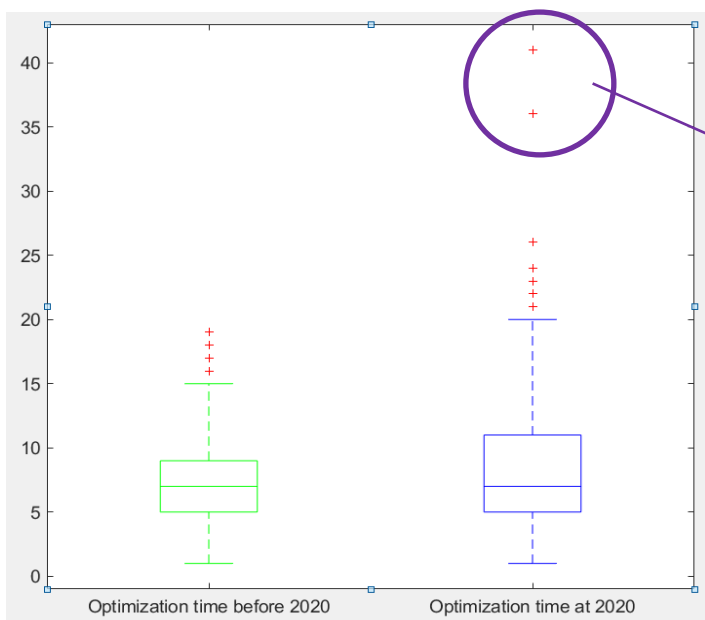
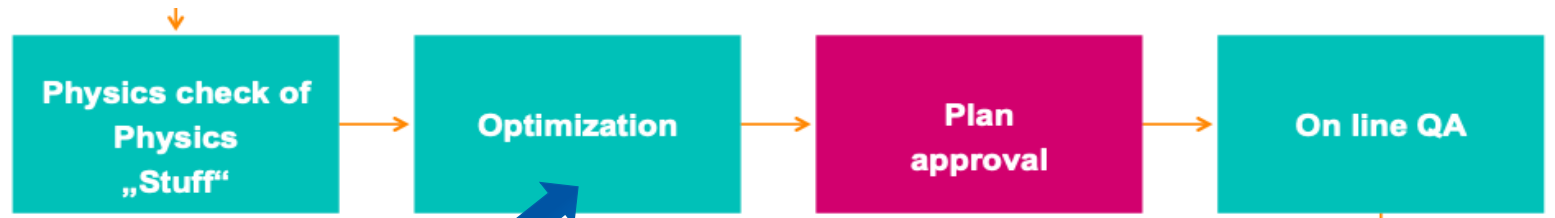
LEARNING

CURVE

Optimization Time: *Start Optimization* – *Start QA*

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Before 2020	1	19	7	3%	333
After 2020	1	41	7	1.7%	907
All	1	41	7	3.4%	1240

- Median optimization time is stable over the years (7 min)
- More variability as of 2020.

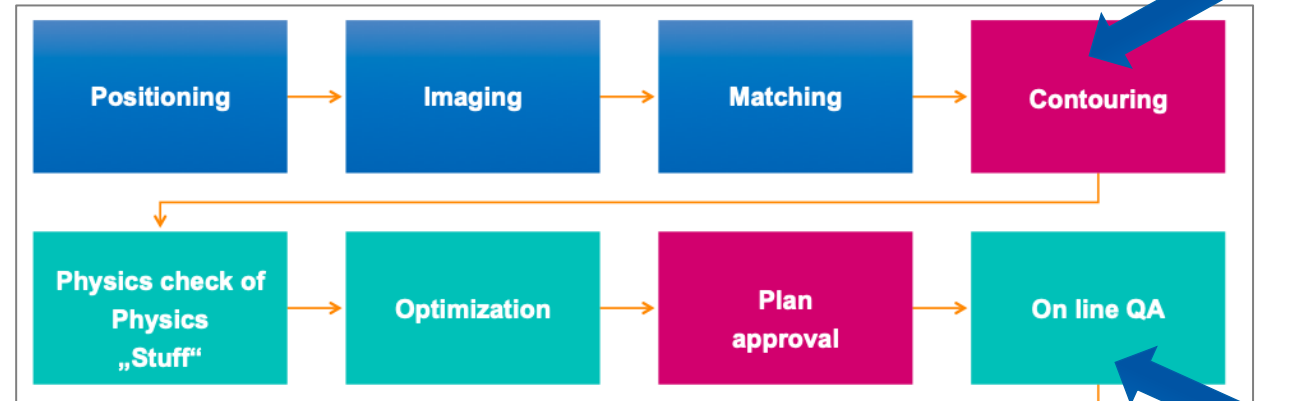
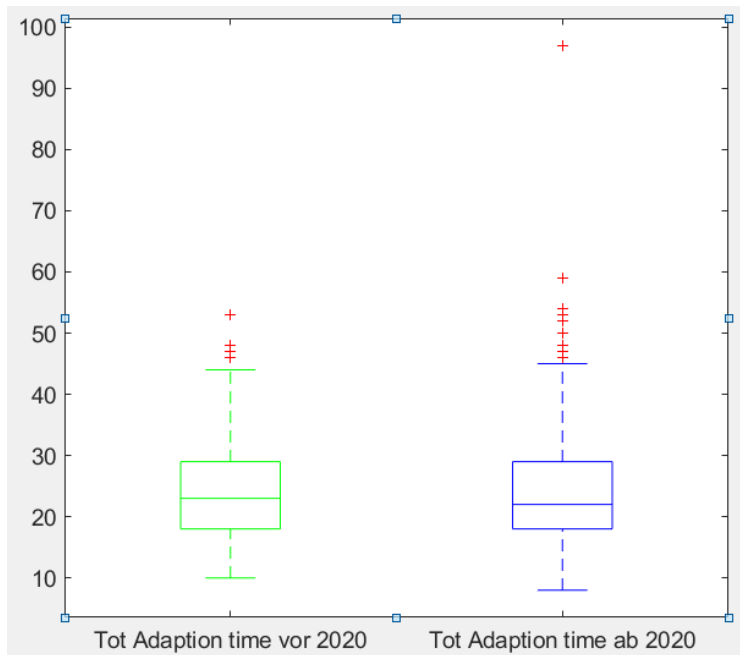


This patient is not a good representation of the data (contouring time 49 min)

Total Adaption Time: *Contouring + Optimization + QA*

	Min [min]	Max [min]	Median [min]	Outlaiers	Nr Fr.
Before 2020	10	53	23	2%	317
After 2020	8	97	22	2%	880
All	8	97	23	2%	1197

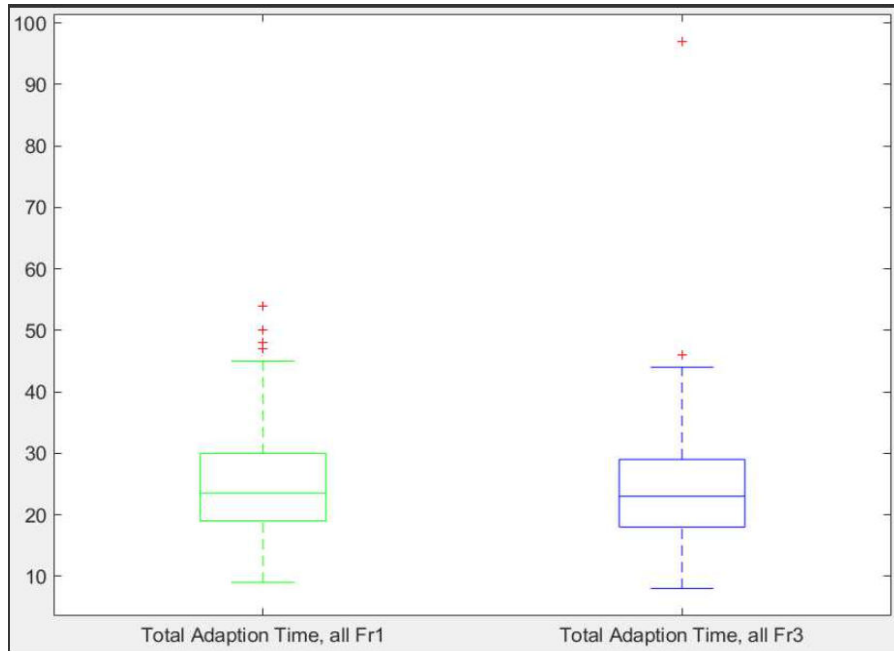
Adaption Time has been stable about 20 min



Total Adaption Time: *Contouring + Optimization + QA*

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
All Fr1	9	54	23.5	2.6%	270
All Fr3	8	97	23	1.6%	247
All Fr (Without Fr1)	8	97	22	2.2%	927

Adaption time is about the same for any fraction



Time recording for non-adaptive



set up time		adaption time						treatment time						total time								
fraction	date	patient on tabl	low res image	high res imag	in roo mset up	match time	total set up	edit contours	plan optimization	QA procedure	ntouring tin	optimization	QA	l adaption	heat imaging til	beam on time	beam complete	total beam tir	pre beam on	patient from table		
1					00:00	00:00	00:00				00:00	00:00	00:00	00:00					00:00		00:00	00:00
2					00:00	00:00	00:00				00:00	00:00	00:00	00:00				00:00	00:00		00:00	00:00
3					00:00	00:00	00:00				00:00	00:00	00:00	00:00				00:00	00:00		00:00	00:00
4					00:00	00:00	00:00				00:00	00:00	00:00	00:00				00:00	00:00		00:00	00:00
5					00:00	00:00	00:00				00:00	00:00	00:00	00:00				00:00	00:00		00:00	00:00

Weekly Adaption

Head and Neck IMRT at USZ

Prescription

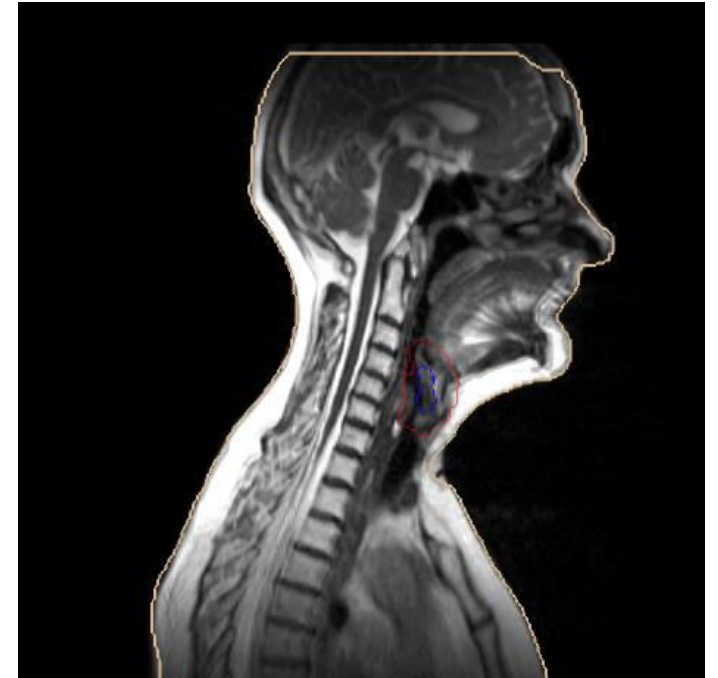
- 70Gy in 35#
- 3 Series
 - 50Gy in 25#
 - 10Gy in 5#
 - 10Gy in 5#

Treatment

- Appointment time slot 25-35 min
- Beam on time about 12 min

Weekly Offline Adaption:

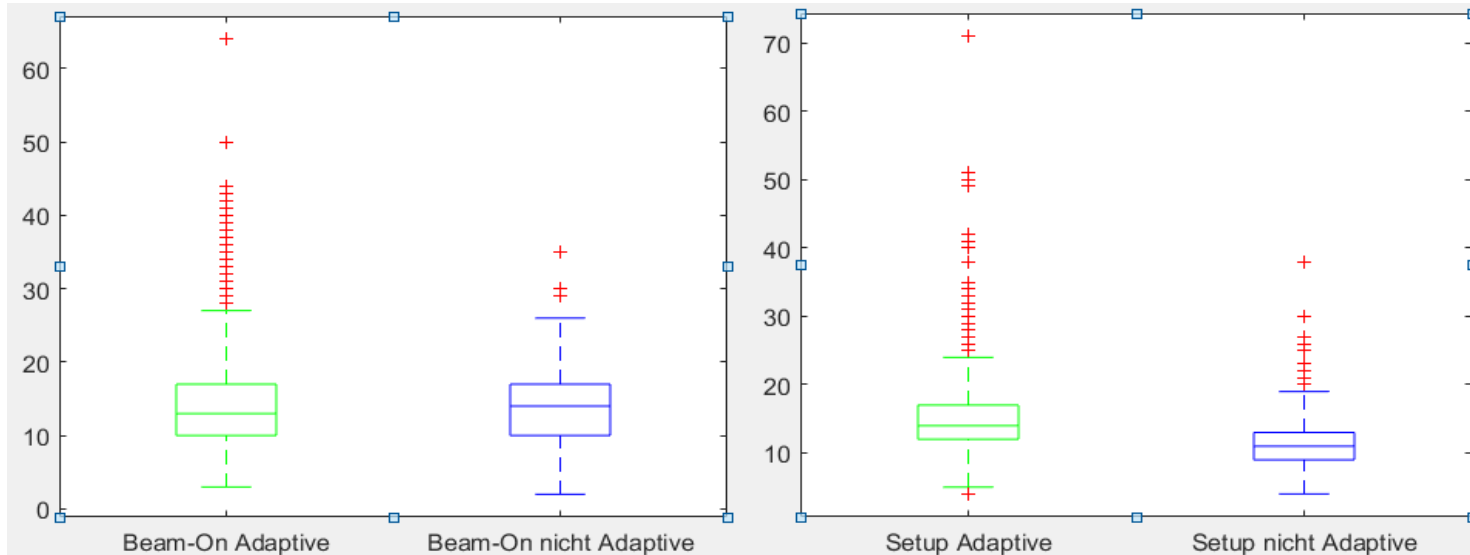
- 3 different types of imaging.
- Weight Opt. and save the plan.
- Treat with “Original Plan”.
- Prepare and contour for the next plan.
- On adaption days we schedule 2 appointments - one as a Sim and one for treatment.



All Patients

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Setup	4	38	11	5.5%	711
Beam-On	2	35	14	1%	709
Total	19	65	34	1%	709

- Setup time slightly shorter
- Less variability for non-adaptive patients (same Tx site for almost all)
- Beam-On Time is about the same for adaptive and non-adaptive plans



All Non-Adaptive Patients

	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Setup	4	38	11	5.5%	711
Beam-On	2	35	14	1%	709
Total	19	65	34	1%	709

HNO

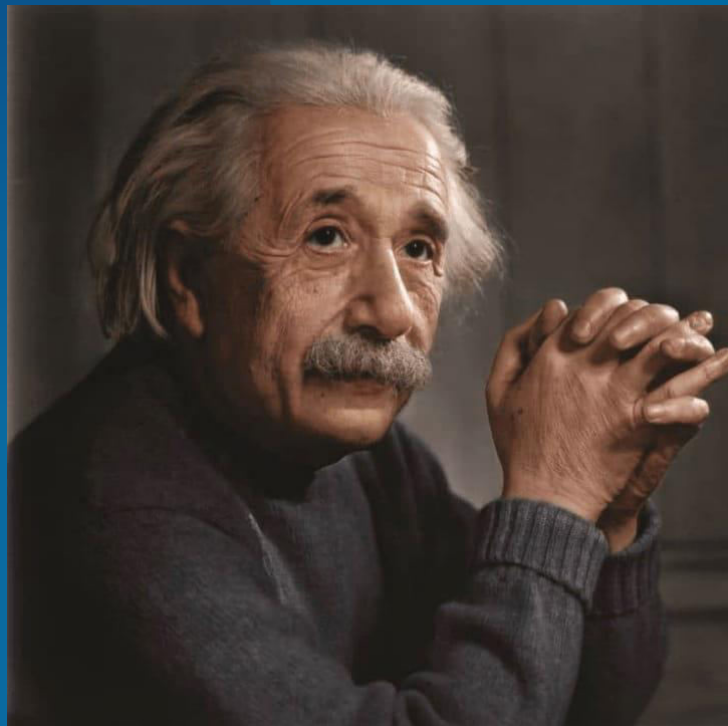
	Min [min]	Max [min]	Median [min]	Outliers	Nr Fr.
Setup	4	30	11	4.4%	640
Beam-On	7	35	14	0.6%	638
Total	19	56	34	0.5%	639

What did we Learn and Goal

Goal is to reduce the
Adapation Time to 60
min or less

- Fraction one is not significantly longer than the following fractions
- The setup time is slightly shorter for non adaptive
- We can predict the appointment time better for non adaptive
- Beam on time seems to be the same for non adaptive and adaptive
- Median optimization time is the same throughout the years
- More variability in 2020
- Team work
- Always optimizing procedure

“I never think of the future. It comes soon enough”



Thank you!

Ina.nilo@usz.ch

