

# Implementing ExacTrac Dynamic and how it changed our practice

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## Purpose

The purpose of this project was to review the results from the first 30 patients treated with ExacTrac Dynamic at our center and assess the impact of intrafractional monitoring as well as surface monitoring.

## Materials and Methods

At NUH we plan and treat SRS patients using Elekta Versa HD linacs and EXT. In April 2021 we installed EXD on a second linac so as to expand our service. Within EXT there is the option of intrafractional monitoring, with X-rays being taken at cardinal angles while the treatment is being delivered. This however was not used.

With the implementation of EXD the option of intrafractional X-ray monitoring, along with the surface monitoring was decided to be investigated. Results from the first 30 patients would be collected and reviewed so as to assess the impact of this additional functionalities. The tolerances for intrafractional X-ray monitoring were set at 0.5mm and 0.5°. For surface monitoring the tolerances for triggering X-ray Imaging were set at 1mm and 1°.

We reviewed:

- How often the intrafractional X-ray images resulted in a positional deviation over the tolerances
- How often the surface monitoring was out of tolerance
- Agreement between the deviation between surface monitoring and intrafractional X-ray monitoring

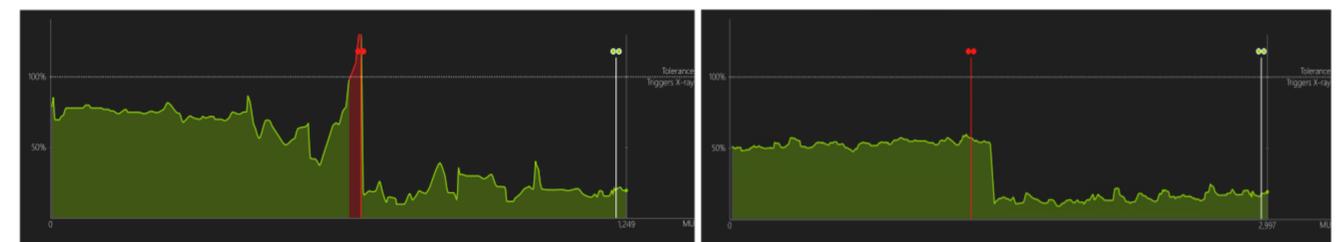
A verification image was taken every time the surface or intrafractional X-ray monitoring was triggered and these images were reviewed prior to applying any shifts.

## Results

A total of 42% (13/30) of the patients required to be repositioned based on intrafractional X-ray imaging. The shifts were applied in 93% of the patients. (12/13). The mean displacement ( $\pm$ SD) is shown in the table below.

	Shift (mm)			Angle (°)		
	Lateral	Longitudinal	Vertical	Pitch	Roll	Yaw
Mean	-0.01	0.00	-0.03	-0.31	0.03	0.03
SD	0.18	0.44	0.16	0.49	0.35	0.33

The surface monitoring was triggered in one patient (3%). This was to be expected considering the trigger point for surface monitoring was larger than for X-ray monitoring. However, there were patients for whom the surface monitoring showed an improvement after a shift was applied due to intrafractional X-ray monitoring. No agreement was found between surface monitoring and intrafractional X-ray monitoring.



## Conclusion

The Intrafractional X-ray monitoring available in EXD improves the accuracy of our treatment delivery. We will implement it on our older EXT system as well. The surface monitoring provides useful information. Future work: we will evaluate lower trigger points for surface monitoring in combination with open face masks.