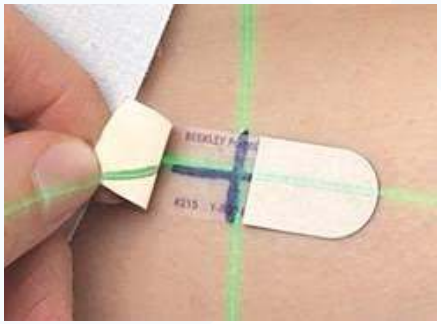
SULTAN QABOOS COMPREHENSIVE CANCER CENTRE

Tattoos VS SGRT For RT Breast

FATEMA ALBALUSHI , AYA ALZIDI , IQBAL ALAMRI , DR.JAMSARI KHALID ,DEVISREE , JISHAN JALADHARAN

TATTOO METHOD



Align the patient by using tattoo with 3 lasers (sagittal, coronal and longitudinal)

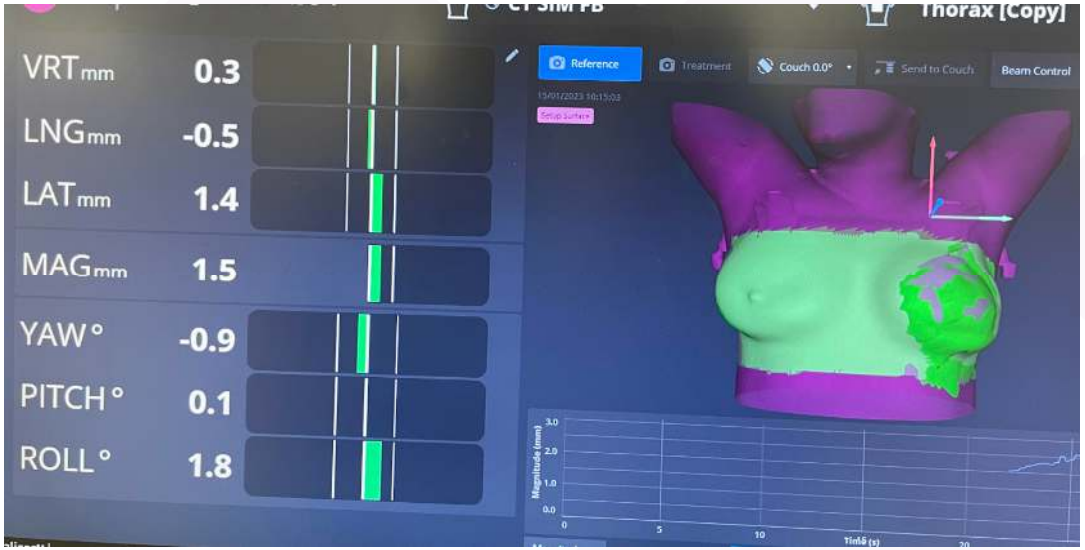
Manually or automatically shift the couch to the treatment isocenter

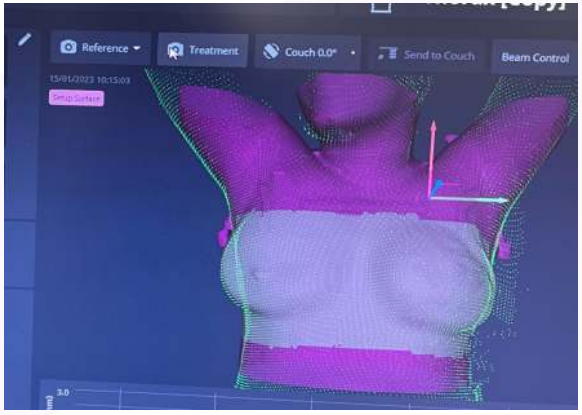
For Initial alignment Perform Anterior MV or KV image to check the arm and chin position

Perform CBCT Verification and apply any requirement correction

Proceed with treatment delivery

SGRT METHOD





position the patient straight at midline

shift the couch approximately to treatment isocenter, based on live SGRT information correct patient alignment (arm and chin) and fine tune isocenter real time data as close as possible to zero

Perform CBCT Verification and apply any requirement correction

Proceed with treatment delivery

Reading for RT breast patient

- 22 CBCT FOR 2 patient (11 tattoo vs 11 SGRT)
- Table represent Time & Magnitude for each CBCT vector

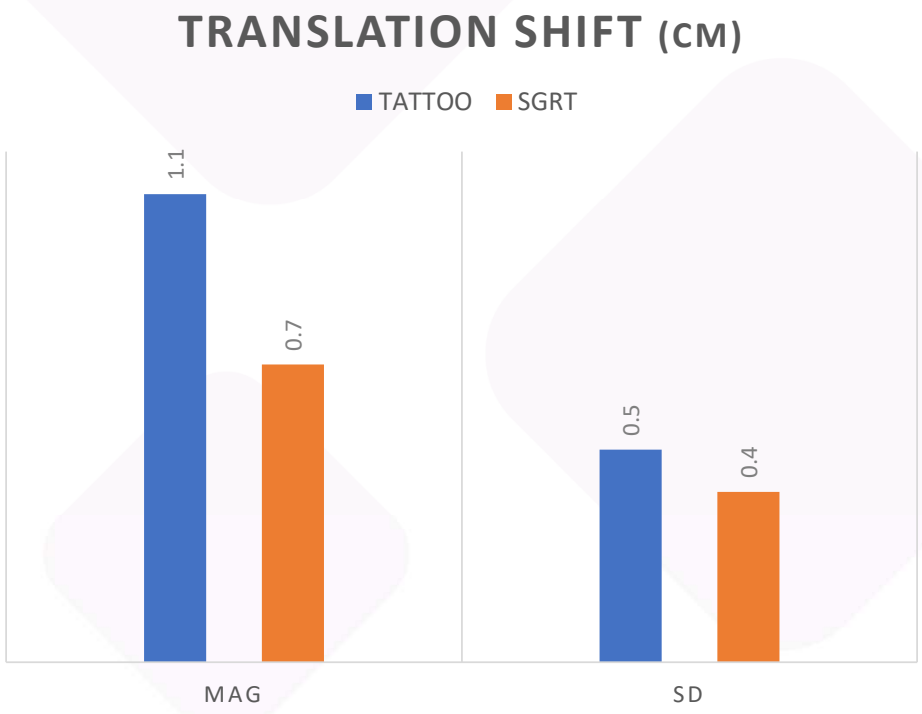
TATTOO					SGRT		
RT Breast	3D Translation (cm)	Rotational (degree)	time (Min)		3D Translation (cm)	Rotational (degree)	Time (Min)
CBCT Shift Magnitude	0.79	2.67	44		0.53	1.8	16
	2.63	2.73	26		1.29	0.59	22
	1.17	0.72	24		0.6	1.02	32
	1.28	1.31	19		0.52	1.93	16
	1.28	0.73	18		0.5	1.1	11
	2.72	1.03	20		0.82	1.91	20
	0.51	2.37	40		0.66	1.12	12
	0.24	1.2	31		0.92	2.09	16
	0.19	1.91	16		0.61	1.23	12
	0.6	2.48	18		0.99	1.79	11
	0.91	1.86	14		0.66	0.81	11
Average OF MAG	**1.12**	**1.728182**	**24.54545**		**0.736364**	**1.399091**	**16.27273**

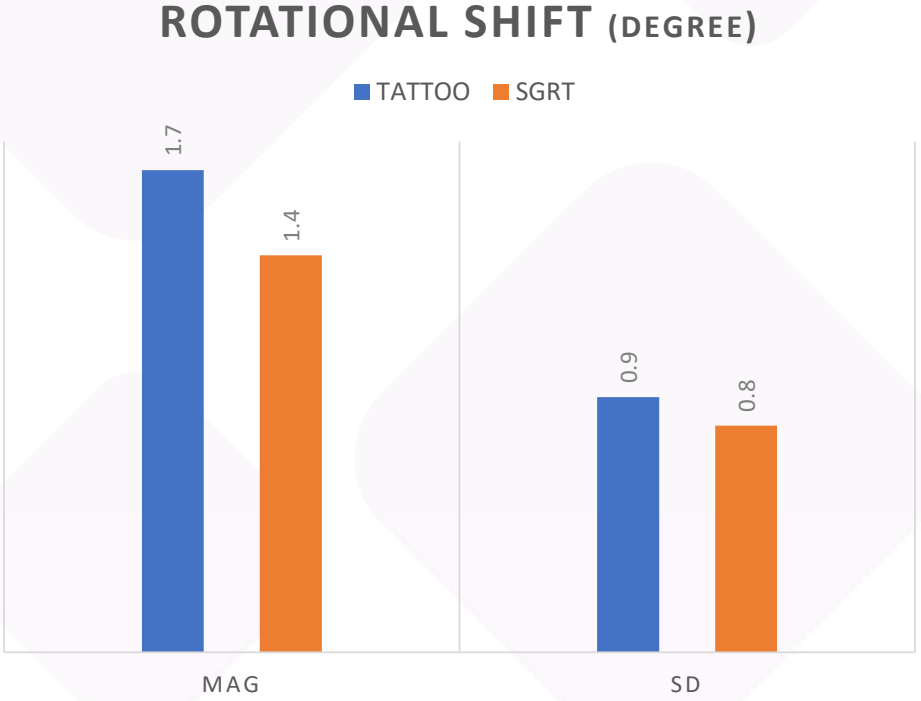
RT breast patient

- 22 CBCT FOR 2 patient (11 tattoo vs 11 SGRT)
- Table represent Time & Standard deviation for each CBCT shift

RT BREAST	SD TATTOO				SD SGRT		
	3D Translation (cm)	Rotational (Degree)	Time (Min)		3D Translation (cm)	Rotational (degree)	Time (Min)
SD FOR CBCT SHIFT	0.25	1.32	44		0.24	1.27	16
	1.41	0.25	26		0.51	0.4	22
	0.65	0.25	24		0.16	0.67	32
	0.82	0.45	19		0.34	0.51	16
	0.56	0.49	18		0.24	0.78	11
	1.18	1.56	20		0.58	1.34	20
	0.07	0.65	40		0.3	0.75	12
	0.16	0.55	31		0.42	1.42	16
	0.14	1.35	16		0.42	0.4	12
	0.18	1.68	18		0.66	1.27	11
	0.6	1.31	14		0.47	0.3	11
AVERAGE	**0.547272727**	**0.896363636**	**24.54545455**		**0.39454545**	**0.828181818**	**16.27272727**

RT BREAST				
	TATTOO		SGRT	
	MAG	SD σ	MAG	SD σ
TRANSLATION SHIFT	1.1	0.5	0.7	0.4
ROTATIONAL SHIFT	1.7	0.9	1.4	0.8





Reading for RT Chest wall

- 12 CBCT FOR one patient (6 tattoo vs 6 SGRT)
- Table represent Time & magnitude for each CBCT vector

TATTOO					SGRT		
RT CW	3D Translation (cm)	Rotational (degree)	Time (Min)		3D Translation (cm)	Rotational (degree)	Time (Min)
MAG of CBCT SHIFT	1.2	0.87	33		0.27	1.58	22
	1.28	1.1	16		0.64	1.35	10
	0.66	0.86	20		0.34	0.6	15
	0.57	2.77	55		0.24	1.2	17
	1.34	1.98	17		0.25	0.58	17
	1.64	0.41	16		0.72	1.08	12
Average of MAG	**1.115**	**1.331667**	**26.16667**		**0.41**	**1.065**	**15.5**

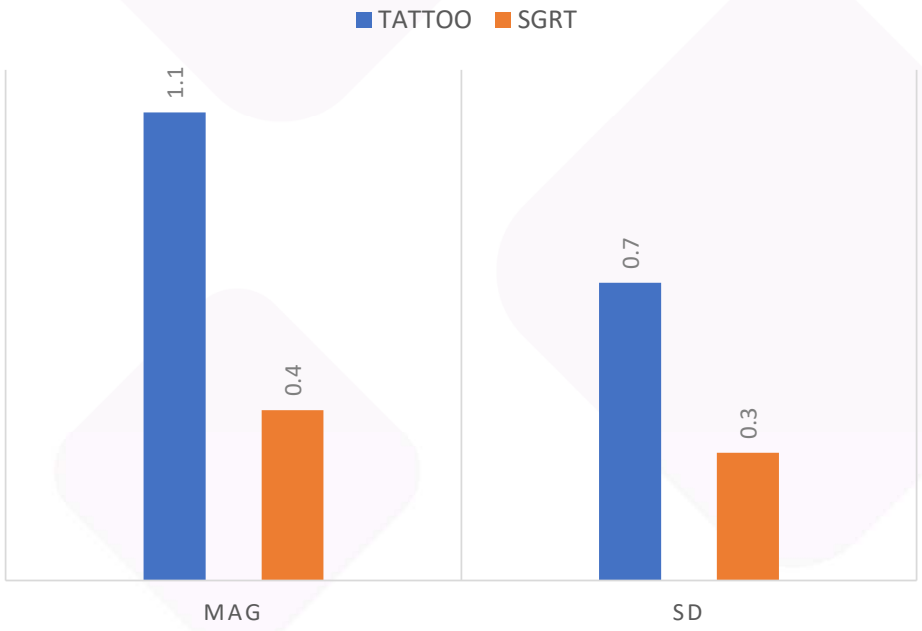
Reading for RT Chest wall

- 12 CBCT FOR same patient (6 tattoo vs 6 SGRT)
- Table represent Time & Standard deviation for each CBCT shift

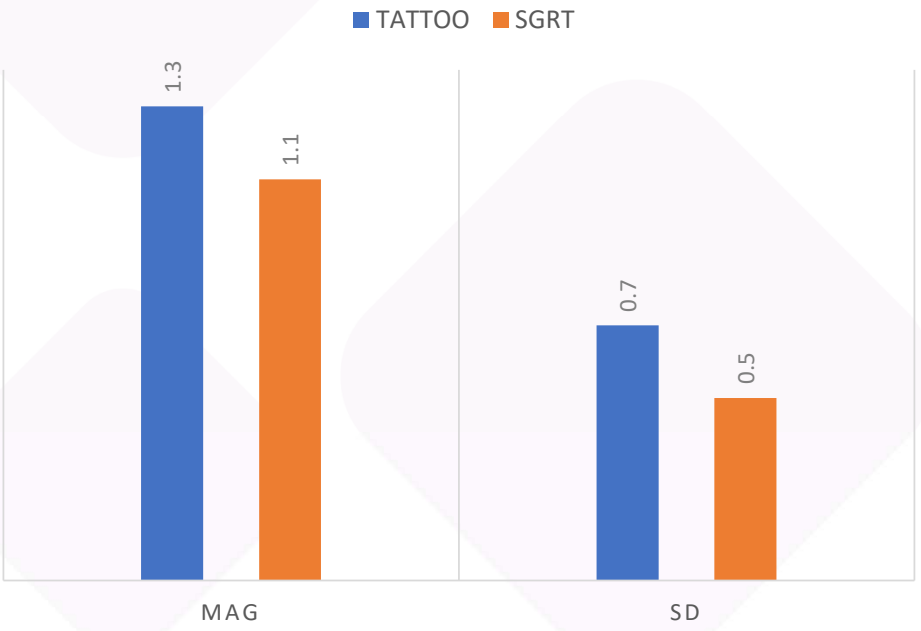
	SD TATTOO				SD SGRT		
	3D Translation (cm)	Rotational (degree)	Time (Min)		3D Translation (cm)	Rotational (degree)	Time (Min)
SD for CBCT SHIFT	0.24	0.61	33		0.19	0.8	22
	0.89	0.26	16		0.45	0.7	10
	0.45	0.61	20		0.2	0.35	15
	0.33	1.59	55		0.16	0.55	17
	0.94	1.11	17		0.17	0.4	17
	1.16	0.21	16		0.51	0.46	12
Average of SD	**0.668333333**	**0.731666667**	**26.1666667**		**0.28**	**0.543333333**	**15.5**

RT CW				
	TATTOO		SGRT	
	MAG	SD σ	MAG	SD σ
TRANSLATION	1.1	0.7	0.4	0.3
ROTATIONAL	1.3	0.7	1.1	0.5

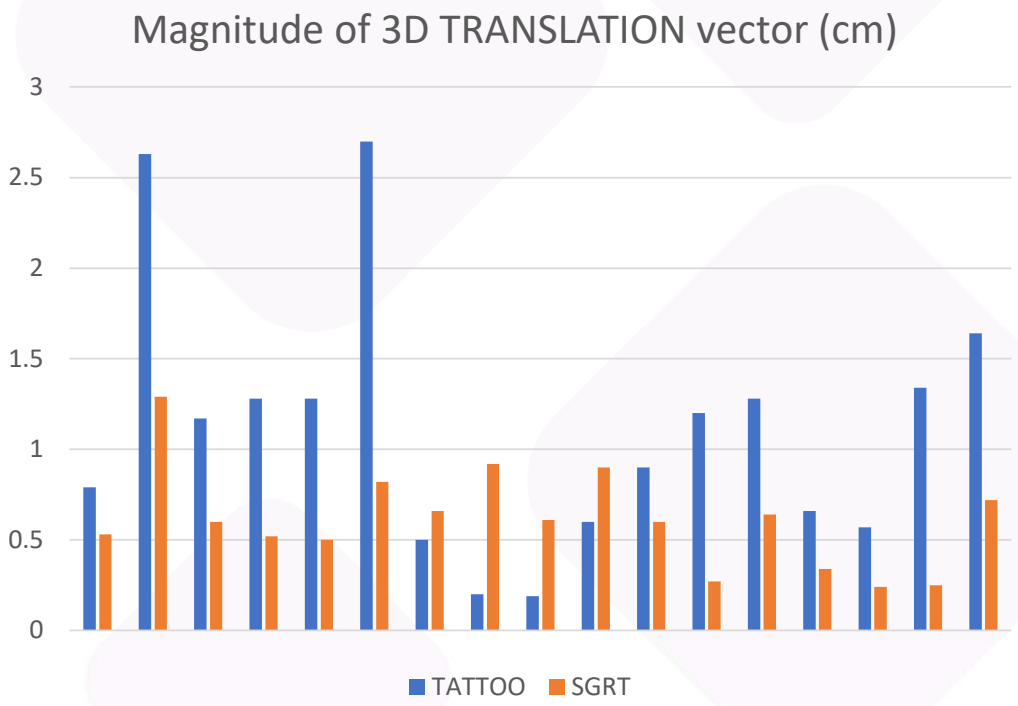
TRANSLATION SHIFT (CM)

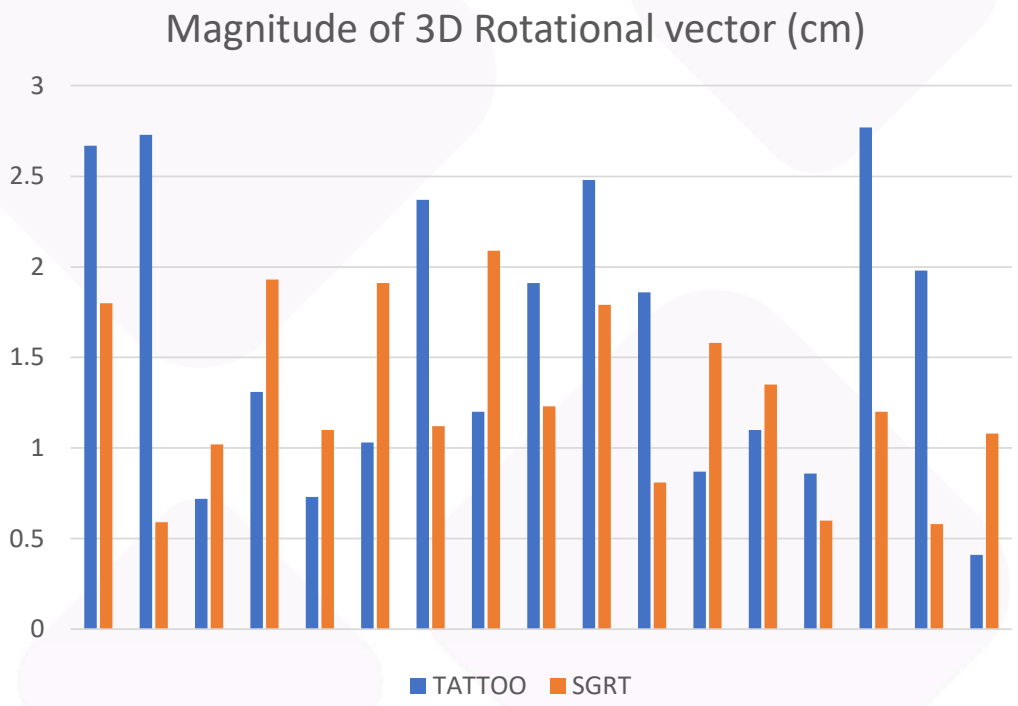


ROTATIONAL SHIFT (DEGREE)

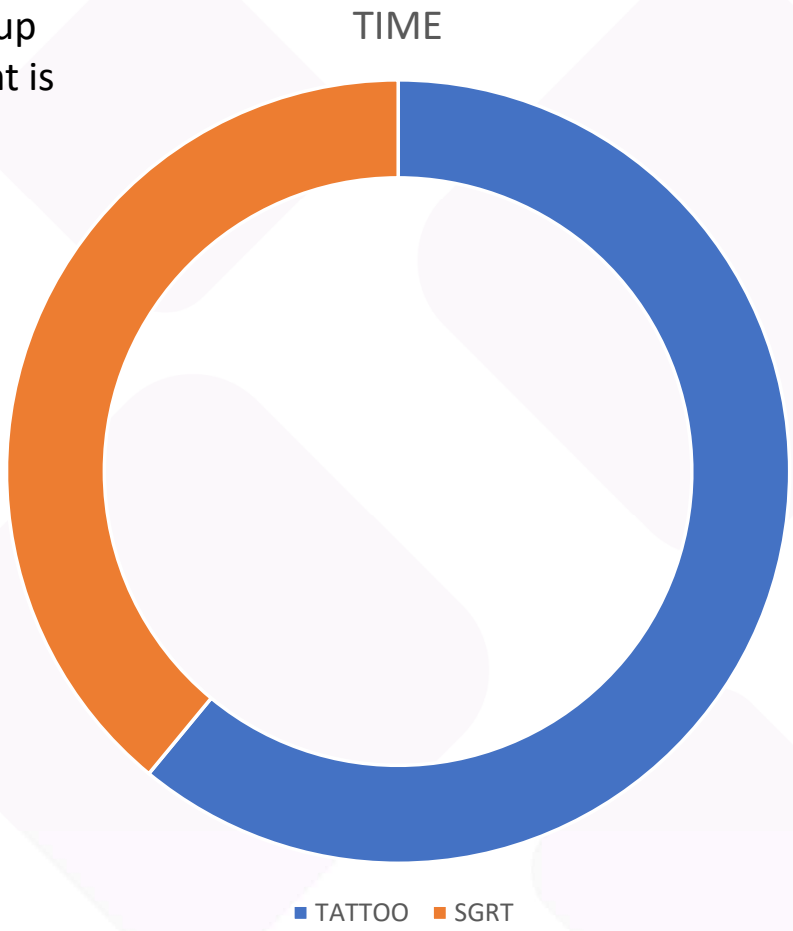


2 histogram gather the magnitude of RT Breast & RT chest wall for translation and rotational vectors





SGRT 10 minute less than Tattoo set-up
From patient entrance until treatment is finished



Results

Accuracy

AlignRT tracks a patient's skin surface in real-time with sub-millimetric† accuracy.

Time consuming

reduces in-room time and treatment slot compared to setup with tattoos.

Improved patient experience

AlignRT can eliminate the need for permanent tattoos, therefore increase patient comfort during treatment journey

In RT breast & CW

The average magnitude and SD in SGRT are smaller than those aligned with tattoo set-up in both 3D Rotational and 3D Translation shift

Reduce IGRT

AlignRT helps in Reducing the frequency of routine Image guided radiotherapy (IGRT)

ONCOLOGY RADIATION THERAPY