

# Comparison of 3D Surface Scan System and ConeBeamCT in Daily Patient Positioning for Breast Radiotherapy

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## Purpose:

Portal imaging is performed before the radiotherapy treatment to ensure that the target volume and patient position are correct. Three-dimensional images are obtained and patient positioning can be done very precisely and accurately with ConeBeamCT. So patients are irradiated with extra radiation except for treatment with ConeBeamCT. In addition, the patient can be positioned with a laser-based surface scanning system Catalyst. The patient's body is scanned with the optical laser system and the patient is positioned according to the scan results with Catalyst. In our study, the differences between the shift values obtained by ConeBeamCT and Catalyst surface scanning were compared.

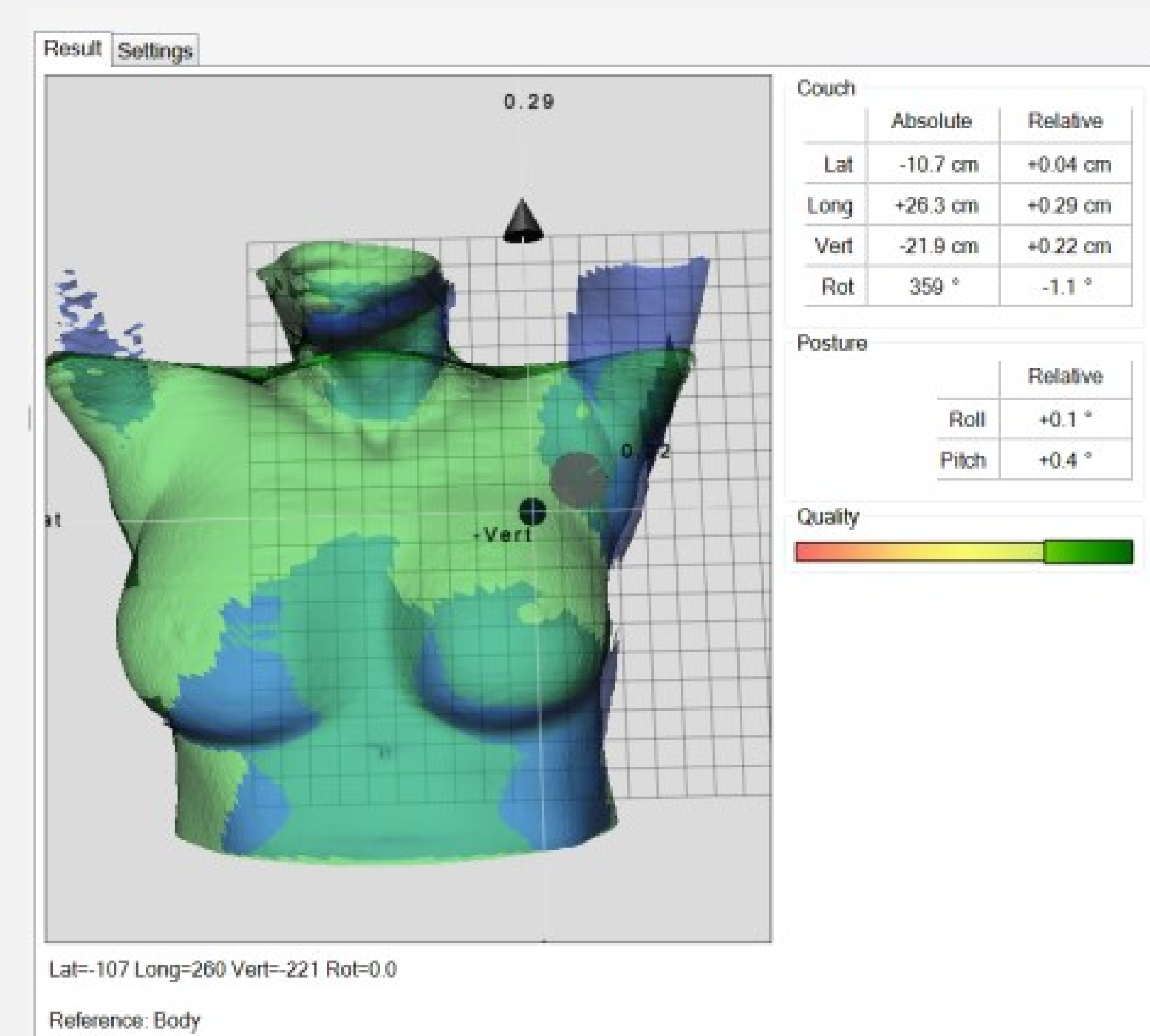
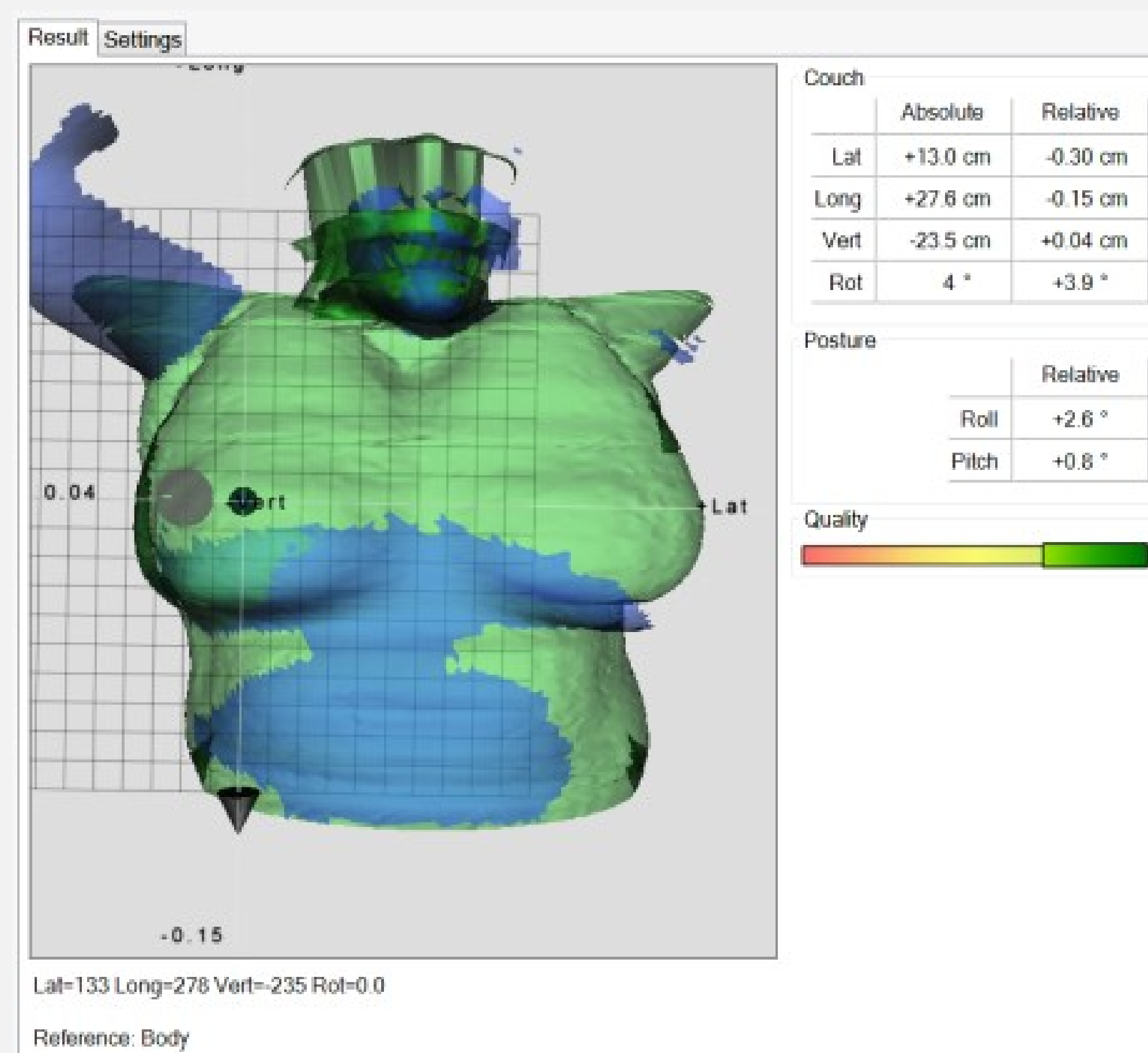
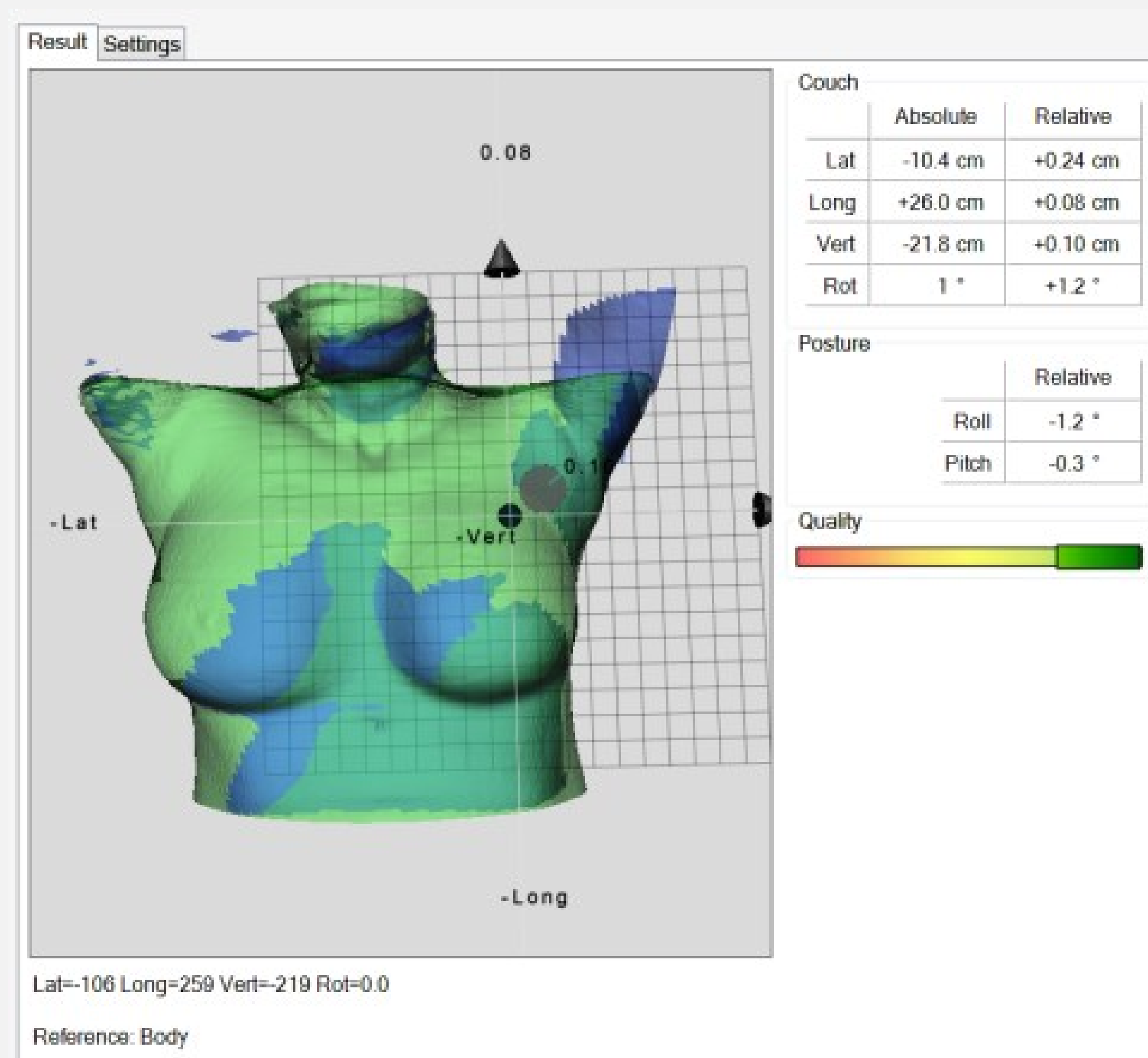
## Methods:

IMRT or VMAT plans are prepared for 22 breast cancer patients in Monaco 5.11 treatment planning system. Two partial VMAT fields or six IMRT fields were used in the plans. 22 patients were positioned with a C-RAD laser-based surface scan in 389 fractions and then three-dimensional images were obtained with ConeBeamCT.

## Results:

ConeBeamCT images were evaluated with the XVI program. The average difference between the Catalyst and XVI shift values were found in the lateral direction X (cm):  $0.24 \pm 0.21$ , in the longitudinal direction Y (cm):  $0.36 \pm 0.29$ , in the vertical direction Z (cm):  $0.23 \pm 0.20$ . The maximum difference between Catalyst and XVI shift values were found in the lateral direction X (cm): 1.28, in the longitudinal direction Y (cm): 1.54, in the vertical direction Z (cm): 1.30.

Patient No	Fraction Number	Average Difference			Maximum D,fference		
		X (cm)	Y (cm)	Z (cm)	X (cm)	Y (cm)	Z (cm)
1	9	0,63±0,4	0,45±0,31	0,34±0,23	1,28	1	0,9
2	20	0,27±0,23	0,41±0,37	0,38±0,36	1	1,3	1,3
3	14	0,23±0,16	0,45±0,25	0,22±0,13	0,55	0,83	0,46
4	24	0,19±0,13	0,29±0,22	0,13±0,12	0,92	0,78	0,6
5	25	0,31±0,23	0,35±0,32	0,18±0,18	0,92	1,32	0,87
6	26	0,23±0,21	0,48±0,33	0,19±0,14	0,81	1,32	0,58
7	13	0,27±0,25	0,25±0,16	0,17±0,14	0,82	0,72	0,64
8	28	0,22±0,22	0,37±0,34	0,28±0,23	1,02	1,54	0,86
9	26	0,14±0,18	0,18±0,12	0,12±0,1	0,32	0,45	0,38
10	21	0,16±0,16	0,22±0,12	0,24±0,19	0,51	0,42	0,84
11	12	0,14±0,19	0,15±0,14	0,17±0,17	0,6	0,5	0,6
12	17	0,24±0,26	0,2±0,14	0,34±0,26	1,01	0,5	1
13	10	0,28±0,29	0,47±0,32	0,27±0,15	0,9	1	0,6
14	16	0,23±0,20	0,41±0,32	0,25±0,15	0,84	0,99	0,52
15	21	0,13±0,1	0,75±0,24	0,25±0,17	0,31	1,13	0,66
16	4	0,16±0,09	0,23±0,15	0,09±0,1	0,26	0,43	0,21
17	23	0,23±0,16	0,58±0,31	0,23±0,19	0,54	1,26	0,8
18	20	0,23±0,20	0,34±0,27	0,15±0,11	0,64	1,07	0,51
19	18	0,18±0,11	0,32±0,23	0,16±0,12	0,42	0,89	0,48
20	22	0,31±0,26	0,26±0,19	0,23±0,18	0,98	0,65	0,67
21	20	0,32±0,22	0,29±0,20	0,32±0,23	0,87	0,63	0,88
Total	389	0,24±0,21	0,36±0,29	0,23±0,20	1,28	1,54	1,3



## Conclusions:

In Breast CA Radiotherapy, target volume should be irradiated accurately for treatment success. Moreover, the right positioning of the patient has a very important role to success treatments. During this procedure, a laser-based surface scanning system can be used to reduce the radiation dose implemented to the patient for portal. Several fraction ConeBeamCT and Catalyst should be used simultaneously and if the difference is small, the number of ConeBeamCT should be reduced and the C-RAD surface scan system should be used, taking into account the entire treatment of the patient.