

# Surface Guided Breast Radiotherapy at USZ to demonstrate the role of SGRT devices on improving treatment quality.

Elizabeth Denney.

## Pre SGRT

All patients received 3 tattoos at the CT planning stage. These tattoos would then be subsequently used everyday to reproduce their scan position, together with daily MV imaging. Positioning of the arm and chin was sometimes difficult as it relied on the breast board settings and photos taken at CT. As a result, it wasn't uncommon for patients to be set up more than once, resulting in more imaging and the patient receiving longer and more uncomfortable treatments.

Gating was done with the Real-time Position Management (RPM) gating system. The location of RPM box in CT was therefore important to replicate and the breathing motion was monitored at this fix point.

For some patients the tattoos can be a permanent reminder of the treatment they received or can be hard to cover when dressing in everyday clothes, resulting in them feeling self-conscious.

## Introduction of SGRT

### TATTOOLESS

For daily setup, instead of using tattoos, the patient's Xiphoid is used as a starting point. Before taking MV images, the position of the treatment region and surrounding anatomy is verified with AlignRT in 6 degrees of freedom. After the patient is setup the treatment capture feature from AlignRT is used (Figure 1). This allows the position of the arms and chin to be checked, thus RTTs can make changes to the setup efficiently in the room before taking images. This procedure is performed to setup patients treated both in Free Breathing (FB) and Deep Inspiration Breath Hold (DIBH).

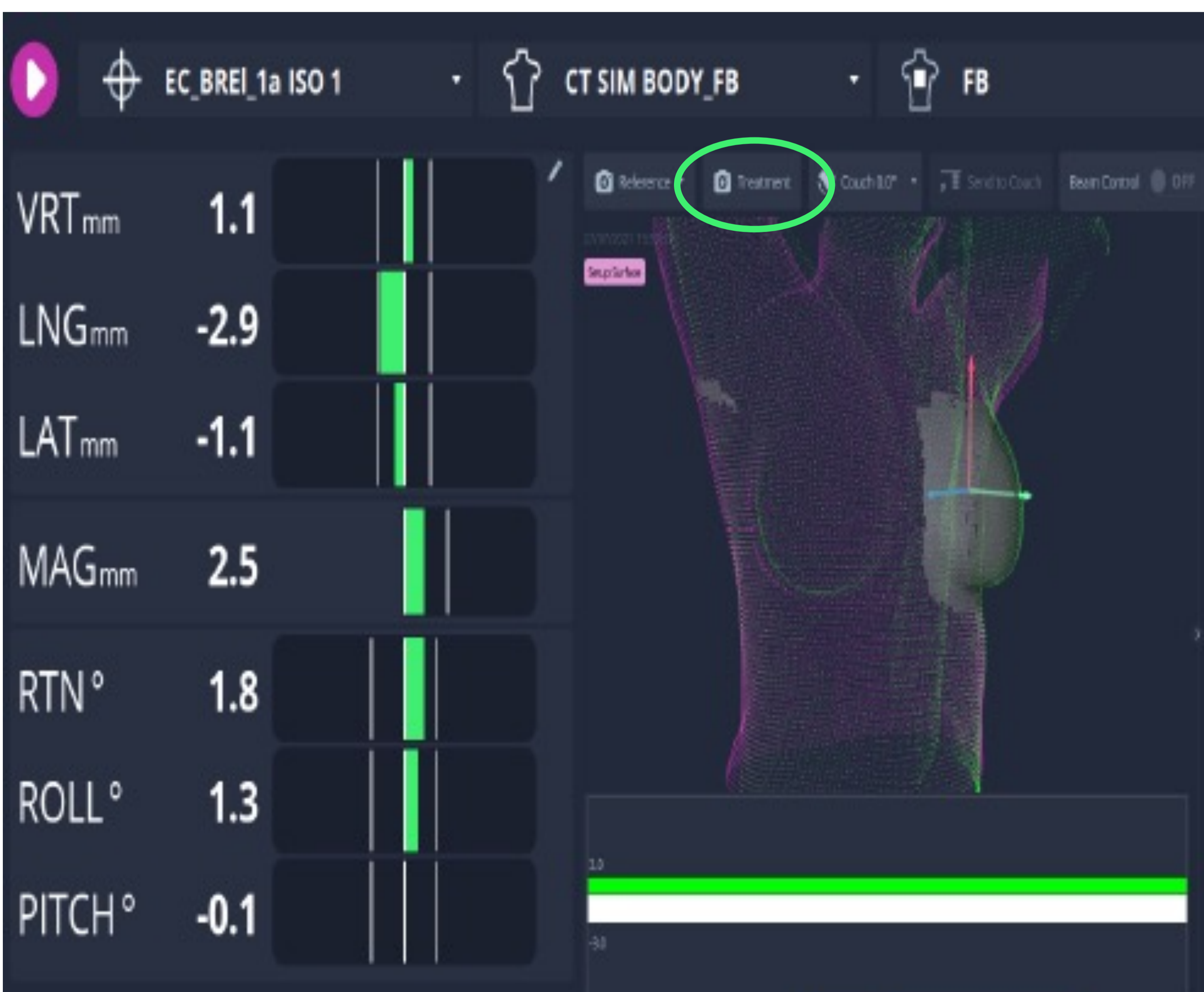


Figure 1. Treatment capture; Left Breast Freebreathing

### ACCURATE

Based on a department study we found that the use of AlignRT produced accurate setups: from a cohort of 19 breast patients, receiving 3D tangential radiotherapy, 94% of 285 fractions had residual MV shift values within 5 mm in all directions after AlignRT setup, (Figure 2).

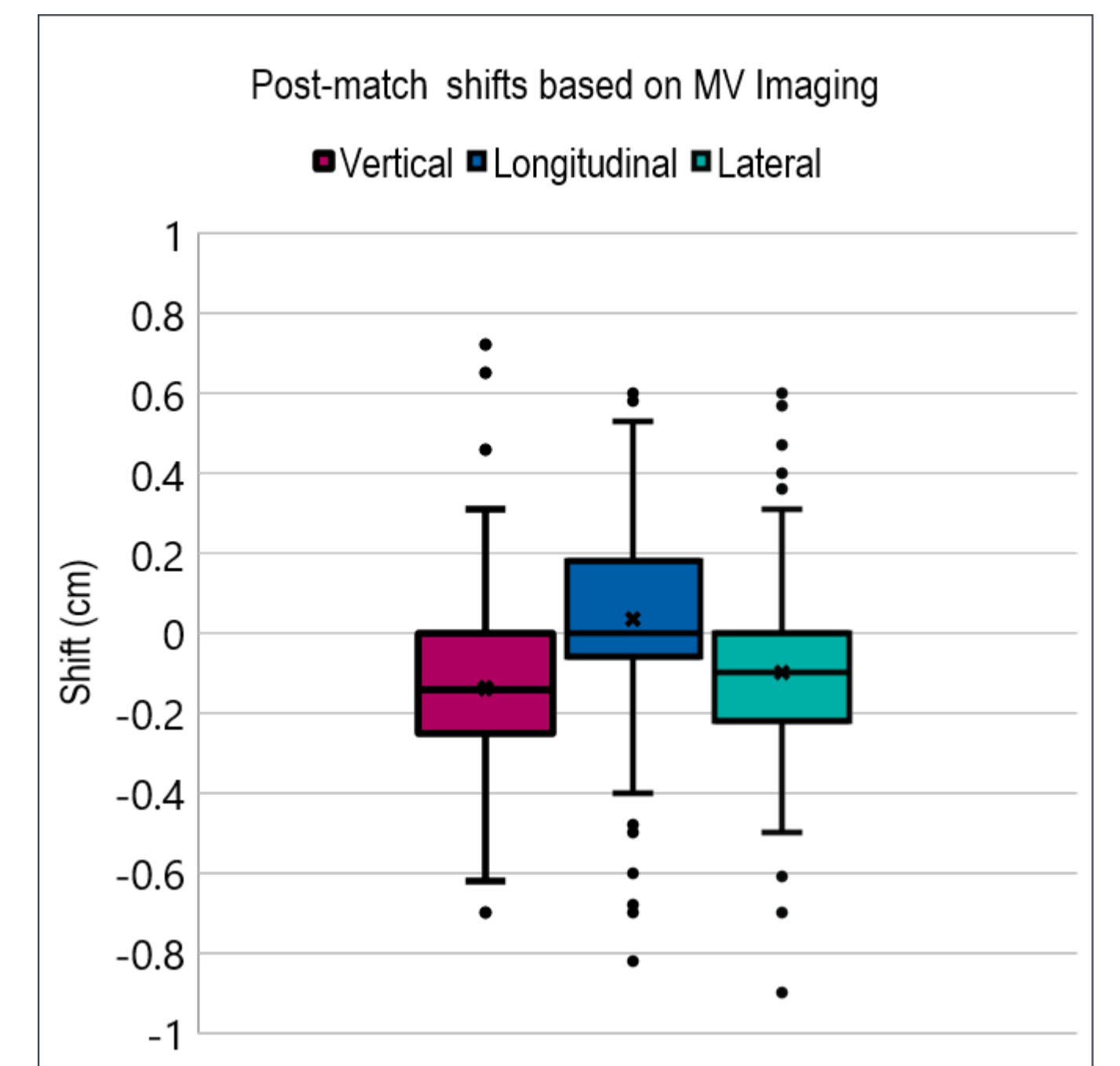


Figure 2. Post match shifts after setup with AlignRT

### IMAGELESS

Confident with the accuracy in the patients setup with AlignRT observed in the study, we moved forward to an Imageless workflow in 2019: now, patients that set up consistently for 3 fractions with MV imaging shifts within 3mm receive imaging only once a week. Since 2020 the number of patients receiving daily images has reduced (Figure 3). Reasons for this include more staff training and system updates.

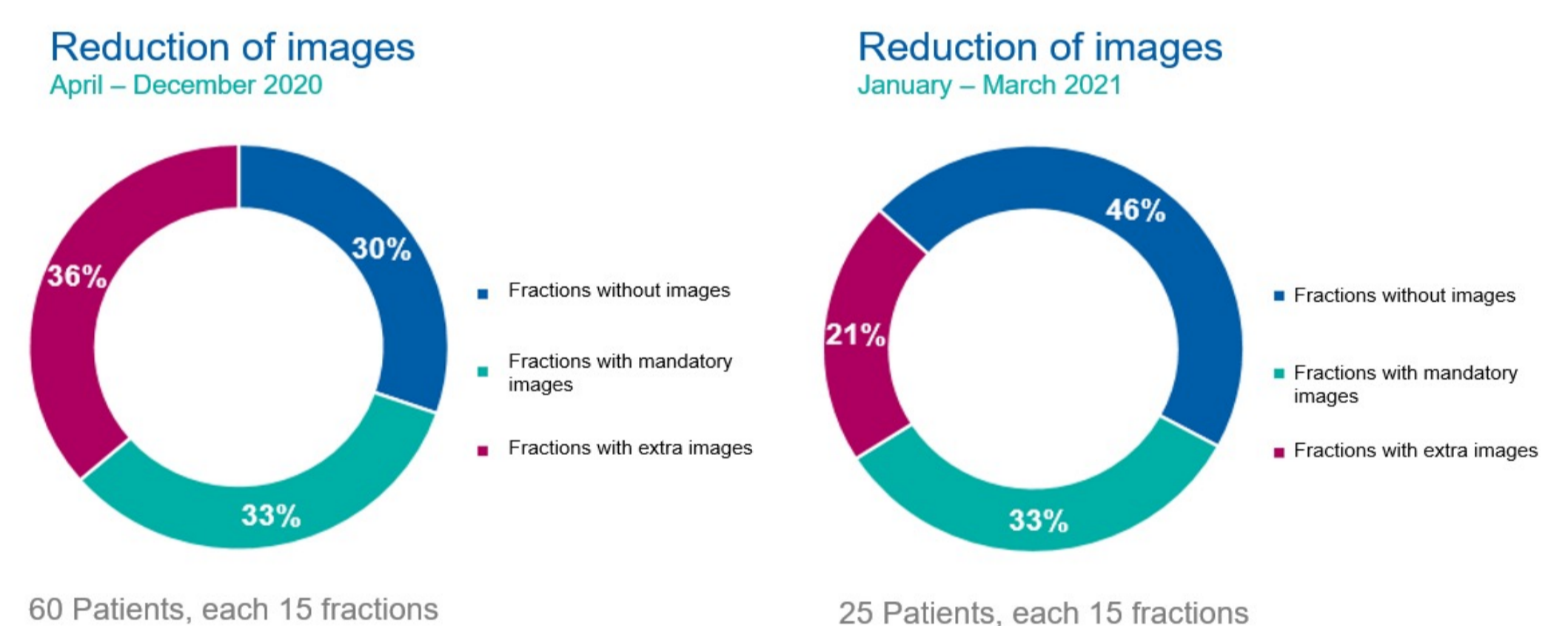


Figure 3. The reduction of images for breast patients receiving 3D tangential radiotherapy

### GATING

All patients are gated using the AlignRT providing us with a more representative surface area compared to the fixed point of the RPM box. The whole patient contour is assessed during the breath hold.

Intrafraction motion is also monitored for all breast patients, helping us deliver a more precise treatment.

### WORKFLOW

The system is simple to use and adaptable throughout the course of treatment, providing us with a smooth and consistent workflow. Since introducing SGRT we were able to reduce appointment times, improving patient experience and the efficiency of the department. In addition to the breast region, the AlignRT system is used at USZ for Chest and Abdomen. Finally, there are ongoing projects testing its applicability with Extremities and Open Face Masks patients.