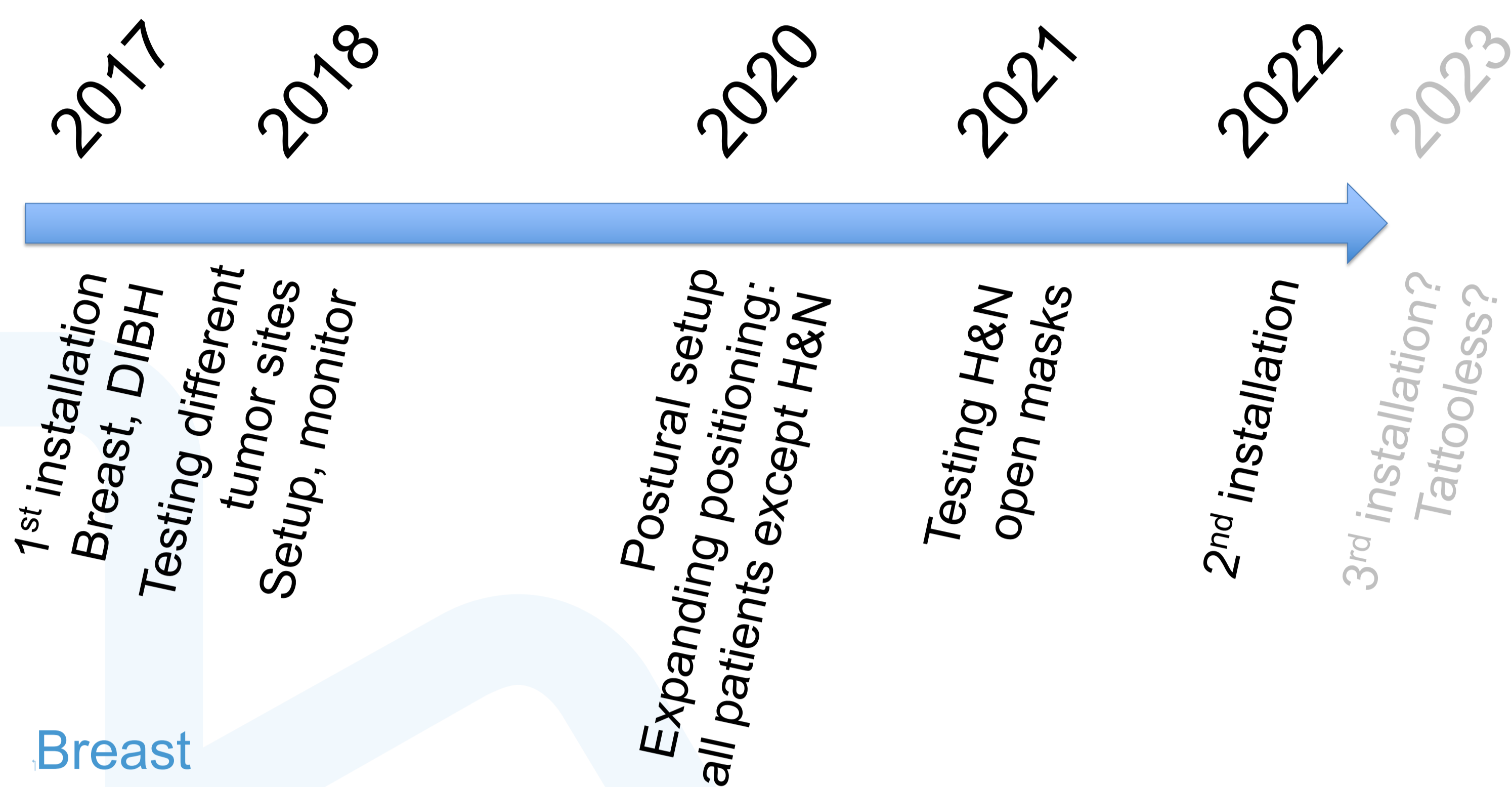


# Expanding use of SGRT: Clinical benefits

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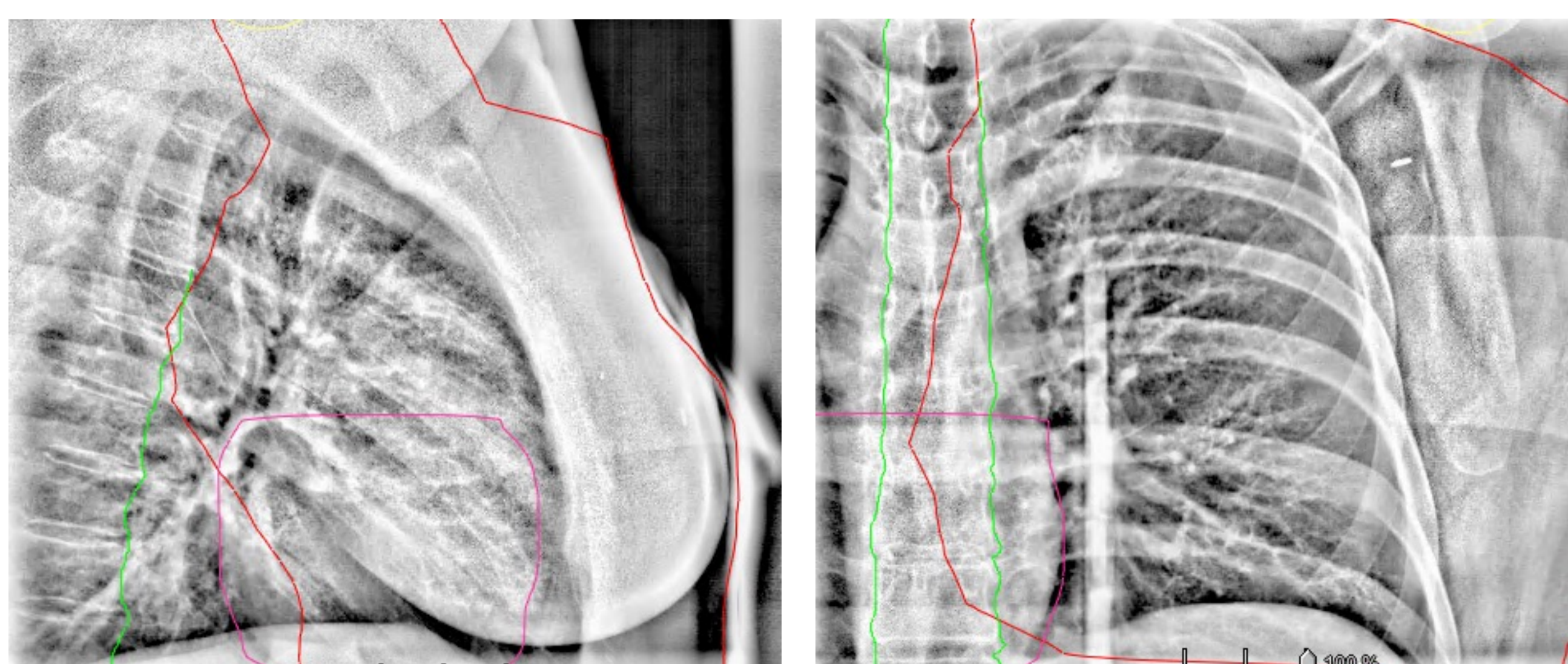
## Breast

The postural setup is used for the correction of patient posture and rotations, including the arm position. The "Send to Couch" is then used to correct couch longitudinal, lateral and rotation. The vertical value is set after the first fraction(s) based on imaging, and is kept constant during setup. The similarity of relaxation between fractions is thus emphasized, as the patient breathes at the same height and reaches the same surface each fraction. Couch vertical can be changed only based on IGRT.

The ROI includes the bony chest wall and portions of the breast. However, especially in DIBH, the majority of soft tissue is excluded, and the ROI may remind a T upside-down.

## DIBH

The initial setup is similar to free breathing. Next, the DIBH surface is monitored in BH, and possibly the "Send to Couch" function is repeated, excluding the vertical. The IGRT match is based on vertebrae (including couch vertical), whereas the sternum position follows the SGRT surface. With both structures matching, the optimal heart sparing is achieved through correct BHL. IGRT-based isocenter corrections require couch movement during BH and a new surface. IGRT-based BHL corrections require BH above or below the old surface, and a new surface.



**Fig 1.** The image match in DIBH is based on the vertebrae. The sternum will be guided to the correct location with SGRT. This combination results in correct BHL.

## Tampere University Hospital

- 6 treatment units (4 daytime, 2 day + evening),
- ~ 2,500 patients per year
- 40% of patients on machines with AlignRT (20% until 2022)

## Head&neck

The open mask improves patient comfort and is ideal for claustrophobic patients. SGRT aids in correct rotations, especially in nodding. Systematic errors can be corrected with new SGRT surfaces over CT-surfaces.

The open mask is first placed on the patient. The mask base is indexed, and all couch values (vrt, lng, lat) are set from planning or previous fractions. Therefore "Send to Couch" is *not* used. The rotations are corrected inside the open mask. Finally, the shoulders are corrected with the postural setup.

The images match well with the head rotations, the shoulders may require repositioning with short masks. Long masks fix shoulders better, but SGRT cannot be used. The choice depends on the clinic.



**Fig 2.** The head rotations are corrected with SGRT readings, and the postural setup is used for the shoulders.

## Other anatomical locations

The postural setup is used for patient setup. The pitch and yaw are first corrected, and then the move couch function is used.

- Pelvis: The groins should be inside the ROI, genitals and belly outside.
- Limbs: The target should be inside the ROI, and at least one landmark should be included, such as knee, ankle or elbow.

## Clinical benefits

- Postural setup improves setup process.
- Open mask increases patient comfort
- Large movements, e.g. cough, are detected

**Acronyms:** Breath hold (BH); Breath hold level (BHL); computed tomography (CT); deep inspiration breath hold (DIBH); image guided radiation therapy (IGRT); region of interest (ROI); surface guided radiation therapy (SGRT)