



FS 35510



## CT process for Radiotherapy CT Planning for Breast Radiotherapy

### SCOPE AND OBJECTIVE

Procedure for patients receiving radiotherapy CT planning for breast radiotherapy.

### RESPONSIBILITIES

Entitled Clinical Oncologist or Consultant Radiographer is responsible for referral for radiotherapy, which covers planning CT scans as specified in .

Entitled breast mark-up radiographer or Clinical Oncologist is responsible for delineation of breast/chest wall region/borders.

Entitled Radiography staff are responsible for scanning in accordance with [RAW061](#)

Mould room staff are responsible for manufacture of custom devices if required.

### DOCUMENTATION

Operation of the CT scanner in accordance with IRMER regulations	<a href="#">RAW061</a>
Radiotherapy Record for Breast	<a href="#">RAF047</a>
Radiotherapy booking request form	<a href="#">RAF 022</a>
Radiotherapy consent Form	<a href="#">MEF023</a>
Radiotherapy treatment prescription form	<a href="#">RAF011</a>
Oncology Case Notes	
CT Scan regions	<a href="#">RAR024</a>
Radiation planning or treatment/imaging out of protocol	<a href="#">DEW005</a>
Custom Treatment Protocol (only if applicable)	<a href="#">MEW201</a>
Referral of Patients for concomitant medical exposures	<a href="#">RAW034</a> , <a href="#">RAF026</a>

### METHOD:

Radiographers must be in receipt of the following documents prior to CT scanning [RAF022](#), [MEF023](#), [RAF011](#)

#### All patients (excluding VMAT)

- Ensure patient is comfortably positioned on Civco Breast board.
- Breast board elevated up to 5 degrees (as a standard but can be higher/lower)
- Both arms raised above head, supported and symmetrically positioned where possible.
- Knee supports as required.
- Bum stop moved up to support the top of the legs/buttocks.
- Head support should fit the nape of neck and back of head.
- Ensure head/body is straight.

#### VMAT Patients

- Position patient on wingboard with both arms raised above head
- Knee supports as required.
- Ensure head/body is straight.

**For DIBH Patients:** Refer to section below detailing the DIBH procedure.

#### For Nodal Irradiation.

- Ensure the chin is tilted backwards and access to Supra Clavicular region is clear and level.

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## Set up problem solving

- Patients unable to get arms up: contact oncology physiotherapist for advice re exercises.
- Patients, for whom the breast board is too long, utilise the in-house back supports placed between the backrest and bum stop to allow the patient to be positioned further up the breast board.
- If this does not enhance patient comfort and positioning, consider using the wingboard and/or a bead bag.

## BREAST PATIENTS

- Entitled breast mark-up radiographer or Clinical Oncologist will define breast tissue, then place anterior and lateral alignment marks approximately halfway through the breast, in the sup/inf direction, in line with the nearest number on the breast board.
- Position markers onto the patient as follows; Beekley spots on ant and lat alignment marks, wires to indicate edge of breast tissue and wire over the scar.

## CHESTWALL PATIENTS

- Entitled breast mark-up radiographer or Clinical Oncologist will place superior and inferior borders of proposed treatment fields, then place anterior and lateral alignment marks approximately halfway through the breast, in the sup/inf direction, in line with the nearest number on the breast board.
- Position markers onto the patient as follows; Beekley spots on ant and lat alignment marks, straight wires over the superior and inferior borders, and wire over the mastectomy scar.

## ALL PATIENTS

- With the transverse laser running through the Beekley's', checking they are still aligned, advance couch into the bore, CT automatically sets couch length to zero, check marks against the internal laser.
- Move couch in order to set the superior border.
- Use lateral topogram to check patient position in bore ensuring clinical area of interest is within field of view. Height can be modified on CT console to better position patient. Use AP topogram to discern sup-inf borders if required.
- Scan as per [RAR024](#).
- If tattoos are required, Tattoo anterior and lateral marks, complete RIS and ARIA. Complete all relevant sections of the breast record sheet and indicate tattoo positions on the tattoo map.
- For tattooless set-ups; Annotate alignment for CT reference marks on [RAF047](#), record measurement from SSN to Medial CT reference mark.
- Export to planning system.

## DIBH PATIENTS

### Eligible patients

- Left sided Breast/Chest wall patients
- Established cardiac conditions/High risk of future cardiac disease
- Mediastinal tumours for radical radiotherapy (e.g. Lymphoma) with mean Heart dose of 3 Gray
- Nodal breast irradiation including Internal Mammary chain
- Bilateral Breast/Chestwall radiotherapy

Requests for DIBH may also be made as part of a process for Radiation planning or treatment/imaging out of protocol ([DEW005](#)) using Custom Treatment Protocol [MEW201](#)

### The following are examples of exclusion

- Inability to cooperate with breath hold process or to hold breath >20s or to achieve reproducibly
- Palliative radiotherapy
- Patients requiring IV contrast
- Patients unable to raise their arms for the required position.

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## CT scanning preparation and process:

**All patients must be supplied with appropriate Deep inspiration breath hold information sheet prior to attending pre treatment appointment and have attempted breath hold exercises.**

- Counsel patient on DIBH during pre-CT chat
- Position patient as per [RAW127](#) or [RAW134](#), Entitled radiographer performs breast mark up
- Complete radiotherapy record form [RAF047](#), [RAF046](#)
- Position the patient on the breast board, optimal position in the centre of the bore
- Asses the position, if the patient looks like they will exceed the 500 FOV then consider the advice given in the *problem solving* section below
- If required, manually adjust the LAP lasers to find a suitable place for reference markers.
- Mark up ant and lat ref points during free breathing
- Ask the patient to take a few deep breaths in and out. When ready ask patient to breath hold.
- Mark this position with pen. Extend ink marks inferiorly onto the waist on left side so it can be seen on the in room camera.
- Ask the patient to breathe in/out/in and hold their breath. Repeat 2-3 times to check reproducibility of both sets of marks. If reference marks need adjustment, do this now.
- Place beekley markers (4mm) on free breathing reference points. For breath hold place T wires on lat marks and 2mm beekley on ant mark.
- Auto advance couch into bore, couch sets to zero
- Set start position in cranial position
- Position CCTV camera/adjust lighting so laser/skin marks can be seen
- Check patient can hear you on intercom
- Perform Ant and Lat Topograms in free breathing, ensuring start position is same for both scans (last SP).
- From lat topogram check the patient position in the bore, if required adjust the couch accordingly to get the patient centrally taking into account the possibility of collision. If adjusted, new breath hold monitoring marks will need to be placed on the patient.
- Set start /end position for scan [RAR024](#) ensuring start and end position is divisible by 2.0mm
- Perform first scan (Free breathing)
- Load breath hold scan, automatically resets to scan parameters of the previous scan. Do not make any adjustments, move couch to start position.
- Using Intercom ask patient to hold breath, check on the camera that the lasers align to the breath hold monitoring marks and initiate scan
- On completion of scan – ask patient to breathe freely
- Measure position of breath hold marks relative to free breathing reference marks and note on radiotherapy record [RAF047](#) or [RAF046](#) if not using Breastboard
  - If Tattoos are required, Tattoo free breathing reference points
  - For tattooless set-ups; Annotate alignment for CT reference marks on [RAF047](#), record measurement from SSN to Medial CT reference mark.
- Export free breathing and breath hold scan to treatment planning system

### **Problem Solving**

**NOTE: It is crucial that any patient with mobility problems, arm problems, obese, laterally falling breasts, those requiring vac bags or supports that a member of planning and treatment is consulted to check viability of set up, to try to avoid unworkable set ups.**

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## FIELD OF VIEW ISSUES

**Any extra CT scanning beyond that requested on [RAF 022](#) requires to be referred for and justified as specified in [RAW034](#) using [RAF026](#).**

For patients on the breast board whose contour is outside the 500 field of view take the following steps.

- Consider that the ANT topogram may be deceiving due to the projection in relation to the patient position in the bore.
  - If required arrange for a mini scan (following the process as specified in [RAW034](#) using [RAF026](#)) of just a few slices of what looks to be the largest point on the patient – check on the axial images whether contour is within the 500 field of view or not.

### ***If outside the field of view then:***

- Use the wingboard instead of the breast board
- Check topogram for placement within the 500 field of view, If required arrange for a mini scan (following the process as specified in [RAW034](#) using [RAF026](#)) of just a few slices of what looks to be the largest point on the patient – check on the axial images whether contour is within the 500 field of view or not.

### ***If outside the field of view then:***

- Offset the wingboard 5.0cm laterally
- Check topogram for placement within the 500 field of view, If required arrange for a mini scan (following the process as specified in [RAW034](#) using [RAF026](#)) of just a few slices of what looks to be the largest point on the patient – check on the axial images whether contour is within the 500 field of view or not.

### ***If outside the field of view then:***

- Call a senior member of planning **AND** team lead treatment radiographer/imaging specialist to discuss further.
  - If these members of staff are not available then arrange for the patient to return when all staff groups needed can be present.
- Patient coughs during breath hold – stop scan and recommence when patient has recovered. Failed scan will be a reject as per [RAW034](#)
- Patient cannot perform breath hold – Patient falls into exclusion criteria – continue with free breathing scan and advise Clinical Oncologist/planning
- Contingency for immobile arms – reconsider eligibility for DIBH, breast board and vac bag

Any difficulties with the above should be referred to pre-treatment team lead radiographer.

Version	Date	Changes
1	Aug 2014	All new text
2	May 2018	Added info regarding VMAT setup
3	May 2018	Scan process changed to reflect new work flow in SIEMEN's scanner
4	May 2018	Scan process changed to reflect refined new work flow in SIEMEN's scanner
5	Oct 2018	Removed specific reference to Siemens couch length of -500, removed reference to exporting through Prosoma
6	May 2019	Combined DIBH procedure RAW149 into this. Added information regarding problem solving for patients outside field of view.
7	Jul 2019	Addition of tattoo-less process and removal of chin/ssn measurement.

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