SCOPE AND OBJECTIVE

On set verification and radiation treatment to the Breast/Chest Wall (with or without associated lymphatic's) on the Linear Accelerators.

RESPONSIBILITIES

Entitled Radiography Staff carry out On Set Verification and deliver the radiation treatment to the breast area/chest wall and/or lymph nodes and/or boosts as specified on the Treatment Prescription Form (RAF011), Radiotherapy Record for Breast (RAF047) and the Radiation Treatment Plan.
Entitled Clinical Oncologists/Consultant Radiographers are responsible for prescribing the course of treatment and checking any Cone Beam or repeat planning CT's against original planning CT's.
Radiotherapy Physics Staff are responsible for the preparation and export of Radiation Treatment Plans.

DOCUMENTATION

Treatment Prescription Form	RAF011
Radiotherapy Record for Breast	RAF047
Treatment Sheet Checking at the Varian Treatment Units for Physics Plans	RAW063, RAF041
Imaging tolerance table	RAW056
Imaging training document	RAW125
Custom Treatment Protocol (only if applicable)	MEW201
On Set Verification & Radiation treatment of non standard sites	RAW135
Clinical use of AlignRT	RAW146
Deep Inspiration Breath Hold Treatment – Breast & Thorax	RAW150

EQUIPMENT

Breast board
Wingboard
Pillow or knee rest
Civco/Varian Indexing bar

METHOD

PRE-VERIFICATION

Physics Staff

- Produce Treatment Plan, and export/input data into ARIA.
- Optimal DRR's to be produced (in conjunction with radiographer if necessary).
- Appropriate set up fields are added.
- Enter and check Table Parameters
- Pass plan and accompanying forms onto Treatment staff.

Treatment Staff

- Carry out first and second checks as per 'Treatment Sheet Checking at the Varian Treatment Units for Physics Plans' (RAW063, RAF041).

TREATMENT

Preparation Breast Board/Wingboard

- Attach index bar to treatment couch as specified on the Radiotherapy Record for Breast (RAF047)
- Set the Civco breast board as specified on the Radiotherapy Record for Breast (RAF047) and set up notes in ARIA.
  - ➢ Check Set up notes concur with Radiotherapy Record for Breast (RAF047) on first fraction/on set verification

A Positioning/Set up Deviation must be in place for use of custom devices/supports or the 'old' Breast Board at which point this will be attached and set as specified on the Radiotherapy Record for Breast *and set up notes in ARIA.*

TATTOOED BREAST/THORAX PATIENT - ALIGN RT SET UP

- Perform initial patient positioning using tattoos as specified above and RAW087
- Use Align RT to fine tune the patient position as follows:
  - Confirm appropriate Record Surface is selected
  - Move the patient Sup/Inf to align the anterior (CT Reference) tattoo with the CAX
  - Move the table to the parameters in ARIA of a Treatment Field, on Truebeam this can be done with Couch Load
  - Select Monitoring, correct any rotational deltas by patient manipulation and the translational deltas by couch movements (as close to zero as possible).
  - No Field Border check is required when using Align RT
  - Leave Monitoring on and leave the treatment room, image as per RAW125 & RAW146

TATTOOLESS BREAST/THORAX PATIENT – ALIGN RT SET UP

- Perform initial patient positioning to ensure patient is anatomically straight, and RAW087
- Measure the distance from the SSN to the approximate centre (Anterior CT Reference)
- Mark with a pen and adjust the patient position Sup/Inf until the pen mark is running approximately through the CAX
- Use the Couch Load function or manually move to all the planned couch parameters in ARIA
- Select Monitoring, correct any rotational deltas by patient manipulation and the translational deltas by couch movements (as close to zero as possible)
- No Field Border check is required when using Align RT
- Leave Monitoring on and leave the treatment room, image as per RAW125 & RAW146

Using Align RT to Aid Patient Setup & Beam Gating for DIBH Patients

- Position Patient as above with Align RT whether patient has tattoos or is tattooless
- Follow RAW150 for Method and RAW125 for imaging

NON STANDARD BREAST TREATMENT (INCLUDING BI-LATERAL)

A Positioning/Set up Deviation (Radiotherapy Record for Breast (RAF047) or Custom Radiotherapy Protocol should be used in order to clearly specify requirements.

BOOSTS / PARTIAL BREAST - TATTOOED/TATTOOLESS PATIENTS IF ALIGN RT AVAILABLE

Use Align RT to aid patient set up, as per RAW146

PHOTON BOOSTS / PARTIAL BREAST

- Proceed onto imaging.
- Image as per Imaging tolerance table/Imaging training documents (RAW056, RAW125) as appropriate
- Treat as per radiation treatment plan/prescription.

ELECTRON BOOSTS

- Mark on isocentre
- Take a note of the table parameters, move the table to allow the electron applicator & end frame/cut out to be attached
- Attach appropriate electron applicator & end frame/cut out
- Return the patient to the noted parameters, confirm set up position with picture provided with plan
- Treat as per radiation treatment plan/prescription

In all cases when 'as specified' is used, set up using the information on the Radiotherapy Record for Breast (RAF047)/set up notes in ARIA.

NON STANDARD TREATMENT

A Positioning/Set up Deviation (RAF047) or Custom Radiotherapy Protocol (MEW201) as appropriate must be used in order to clearly specify any non-standard requirements. It may be more appropriate to refer to 'On Set Verification & Radiation treatment of non standard sites' (RAW135)

TATTOOED PATIENTS – NO ALIGNRT

- Contact Planning and request field CAX information
- Mark on where the medial and lateral field CAX falls, if not on tattoo
- Align the medial tattoo to the specified number on the Breast Board scale, or appropriate reference to couch if using Wingboard. NB. *A Positioning/Set up Deviation must be in place if this is not being followed for a set up e.g. Bead bag or breast shell.*
- Check lateral tattoos fall to within 0.5cm of medial tattoo in the transverse plane by adjusting patient position if necessary.
- Align BOTH the lateral tattoos at red laser level and check rotation FSD at the medial tattoo is within 1cm tolerance.
  - If outwith 1cm, carry on with set up, checking all clinical borders and images as usual, but note that rotational FSD is different if later problem solving is required (as may be best to start again)

  Set specified Med FSD to the medial tattoo
- Shift to isocentre
- Carry out specified physics shift from medial tattoo & mark isocentre point on patients skin where planned shifts land (on set verification).
  Shift directly from medial tattoo to isocentre daily if isocentre tattoo is present/visible. Perform planned shifts daily if isocentre tattoo not appropriate/present/visible.
- Set medial glancing field. Check where the field CAX falls in relation to the skin mark (opening MLC's/field jaws if required). Move the couch vertically to fit medial mark. Check coverage.
- Rotate gantry to lateral glancing field, check CAX position in relation to skin mark. If outwith 0.5cm, rotate patient to fit, marking on the sagittal laser and manually adjusting the bed laterally to avoid lateral movement of the patient. Check coverage and recheck medial field CAX is within 0.5cm tol. (If this has been shown to work on previous fractions, you can omit check of medial CAX.)

Clinical borders / CAX position/s *(i.e. vertical and/or lateral)*
Both field CAX positions should be checked after performing shifts (>0.7cm) to ensure clinical borders are maintained.

- If CAX more than 0.5cm off on either/both adjust to bring into the 0.5cm tolerance.
- Height, if over/under marks by around same amount
- Lateral, if over on one and under on the other

These should be small enough not to take it out of imaging tolerance (up to 0.5cm), if not the patient should be re -set up. The clinical border check should continue at each fraction.

Radiographic Imaging
Proceed to Radiographic Imaging (RAW125) - use a 6MV glancing field where possible to obtain optimum image quality & check imager offset appropriately for each MV image required.
Shifts applied from imaging may affect skin surface alignment:

Treatment Delivery

- Once acceptable match achieved - Treat all fields as per radiation treatment plan/prescription.

Tattoo isocentre (on set verification)

- If shift from imaging is less than 1cm (from planning shift), mark on & tattoo this point
- If shift from imaging is greater than 1cm, consider waiting until isocentre is confirmed before tattooing

Problem Solving/If outwith tolerance/s
An increased tolerance of 1cm for clinical borders and 1.5cm for FSD's can be applied for up to 2 fractions at discretion of the senior radiographer. An MDT (Clinical Oncologist, Radiographer, Imaging Lead, Physics) discussion should take place before treatment is continued beyond 2 fractions with any patient specific tolerance being clearly annotated.

If indicated shift as a result of the image match is still > 1cm but < 1.5cm after re-set-up (RAW056)

- Treatment may be delivered at the discretion of a senior radiographer if the clinical borders are within 1cm for one fraction only.

If clinical borders are > 1cm & indicated shift is > 1.5cm

- the patient should be taken off set while a more thorough investigation, normally involving planning is carried out, checking any shift/s etc
- the patient should be set up again and re-imaged (on the same day if possible, consideration being given to the patient and machine workload), applying tolerances as above

If shift as a result of image match after one fractions is still >1.0cm and/or clinical borders are still > 1cm

the set up should be discussed with planning with view to a possible CBCT or repeat planning CT (if CBCT not possible due to clearance)

Problem Solving/Rotation issues
If routinely it is found that there is a rotation required when checking the lateral glancing field, then setting the rotational FSD using the medial tattoo and rotating the patient using the ipsilateral tattoo only, should be considered. This action must be transferred to any subsequent boost.

BOOSTS / PARTIAL BREAST -TATTOOED PATIENTS IF ALIGN RT UNAVAILABLE

Follow 'Preparation Breast Board/Wingboard' as above.
For boosts check phase 1 for any non-standard setup changes (rotation changes etc)
A Positioning/Set up Deviation must be in place for Partial Breast, or have been in place for boosts if this is not a 'standard' set up e.g. Bead bag or breast shell.

Patient Set Up:

- Align the medial tattoo (tolerance: 0.5cm), to the specified number on the Breast Board or appropriate reference to couch if using Wingboard.
- Align BOTH the lateral tattoos and check rotation FSD at the medial tattoo is within 1cm (of tattoo and expected FSD)
  - If outwith 1cm, carry on with set up, but note that rotational FSD is different if later problem solving is required (as may be best to start again)
- Set a medial FSD on the medial tattoo
- Shift to isocentre (carry out specified boost shift daily from medial tattoo)

Refer any problems with the On Set Verification and Breast Treatment to the Treatment Superintendent Radiographer.

Version	Date	Changes
1	Oct 2013	All new text for mono-isocentric breast technique
2	Jan 2014	Tweak of set up/imaging to reflect experiences of initial set ups
3	2014	Updated to refer to on set verification & imaging documents
4	Dec 2014	Updated to incorporate on set verification & boosts.
5	Jul 2016	General update and reference to normalisation FSD's
6	Feb 2018	Updated to refer on when using AlignRT.
7	Sep 2019	Updated to include tattooless, order of content changed accordingly.
8	Nov 2019	Removal of FSD Monitoring.