rotations positioning during the treatment of MCM using VMAT.

Materials and Methods: Eight treatments of MCM were randomly selected from the internal database. These were re-planned for single and multiple isocenters (S-iso; M-iso) VMAT. The prescription was set to 18Gy at 99% of target volume. Paddick conformity index (CI), V100%, V90% for target; V4.5Gy, V9Gy, V12Gy for body; beam-on and door-to-door times were analyzed. For each plan, three shifts (0.5°, 1°, 2°) were applied for pitch and roll for each isocenter, simulating incorrect patient repositioning (1°, 2°) and involuntary motion during the delivery (0.5°). The shifted plans were recalculated with the same monitor units and compared to the reference ones in terms of reduction in target volume receiving 90% and 100% of the prescription dose.

Results: A total of 43 metastases were evaluated. No significant differences were found in terms of CI between the two approaches. M-iso showed significant lower median V4.5Gy and V9Gy with respect to S-iso, while S-iso resulted in reduced beam on time (7.8±2.8 min vs. 10.4±3.2 min) and significant door-to-door time (16.3±2.7 min vs. 27.4±6.2 min). Concerning the rotated plans, there was a worsening with rotation increasing, with median V100% reduction for 2° rotations of 22.5% and 2.7% for, respectively, S-iso and M-iso. Figure 1 reports the full data analysis on V90% and V100% in terms of volume loss.

Figure 1: Delta volume loss for target V90% and V100% in function of pitch and roll rotations.

Conclusions: Adjustments in all six dimensions, including unconventional pitch and roll rotations, are fundamental for MCM. S-iso reducing delivery time is the treatment of choice as the patient comfort is essential for so challenging patients. In case of S-iso, on-line patient monitoring during the delivery in 6D should be performed to avoid undesirable target underdosage.

PD-0470
Optimum immobilisation device for extremity soft tissue sarcoma radiotherapy
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Purpose/Objective: 60-80 patients with an extremity soft tissue sarcoma (ESTS) are diagnosed annually in Ireland. At least half will require radiotherapy pre or post-operatively. Accurate and reproducible patient immobilisation is essential for safe delivery of radiotherapy to these patients. However, the optimal technique remains to be determined.

Materials and Methods: Two lower limb immobilisation devices are compared in this prospective study. Arm A: is an in-house developed device, comprising of customized foot-orfits and footrests, fixed to the treatment couch. Arm B: is a similar device, but has the additional ability to elevate either limb independently.

Results: Preliminary results indicate Arm A is useful for proximal thigh/groin sites when limb separation is necessary and Arm B is advantageous when treating the distal/anterior thigh and calf.

Arm A: 268 ConeBeamCT (CBCT) scans were analysed on 20 patients to date. The resultant CTV-PTV margins required for setup uncertainty are 0.7, 0.5 and 0.6cm for X, Y, and Z directions respectively.

Arm B: 159 CBCT scans were analysed on 13 patients to date. The resultant CTV-PTV margins required for setup uncertainty are 0.6, 0.5 and 0.4cm for X, Y, and Z directions respectively.

The standard deviation of the systematic error (reproducibility of treatment position) was less for B than for A in all directions. Levene's test for equality/homogeneity of variances showed that the variances of the two groups were statistically significantly unequal in the z direction (p<0.011).

Conclusions: This research is on-going. Both techniques satisfactorily immobilise the lower limb, however the results show a smaller CTV-PTV margin could be applied for those patients immobilised with the Arm B device. However, at present both devices are required. Final results of this research study will be available in April 2015; recommendations will be made regarding an optimal immobilisation device.

OC-0472
Whole breast radiotherapy does not affect growth of cancer foci in other quadrants: results from the TARGIT Atrial
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Purpose/Objective: In 1996 we reported that 63% of specimens of mastectomy performed for a unifocal cancer harbour other cancer foci; 80% of these foci are in other quadrants. In contrast, local recurrence after a lumpectomy occurs mainly at the site of the original tumour. Therefore, we hypothesized that cancer foci in other quadrants remain dormant even in the absence of radiation treatment to the whole breast [1]. This academic insight led us to develop the targeted intraoperative radiotherapy (TARGIT) technique using the IntraBeam device. In the TARGIT A randomized trial (n=3451) we compared risk adapted TARGIT vs. whole breast radiotherapy [2].

Materials and Methods: Randomisation occurred either before surgery (Prepathology stratum: TARGIT given during lumpectomy) or after surgery (TARGIT given as a delayed procedure); the main analysis found that using TARGIT during