AxT2 FRFSE, AxT1 and T2FLAIR, MRPerf Ax Dynamic SI C+ and Ax 3D T1 FSPGR. Image fusion of data sets was applied after anatomic landmark matching before target contouring. Alternatively, image matching was also implemented by marker superposition. Translation and rotation corrections were calculated from markers’ displacement and applied in the matching procedure. Target anatomy contours obtained from both procedures were compared and contour shifts measured. These shifts were analyzed to find how the type of matching procedure would affect target contour displacement.

Results: Coordinates of markers showed geometrical displacements (0.15cm-0.35cm) in transverse direction and rotation angles (1.5o-2.0o). These values were used for compensation in the image matching procedure, achieving visual correspondence of target anatomy after image fusion. Target contour displacement after applying both procedures were found to be within the range of 0.0-3cm.

Conclusion: The precise positioning and method using markers is essential to achieve good quality in the image matching, as well as the accuracy in the SRS. It could be improved with more than 1mm for the target and organs at risk, which makes the SRS treatment procedure itself more effective.

EP-2089
Comparison of target volumes for lower gastro-intestinal tumours using PET-CT and PET-MR images
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Purpose or Objective: The use of PET-CT in radiotherapy planning is emerging as a modality to aid target volume delineation in lower GI tumours. MRI provides superior soft tissue definition compared with CT which may offer further benefit in radiotherapy planning (Wang et al., 2011).

Since 2008, PET-CT has been used for radiotherapy planning within the department and, to date, we have scanned over 170 patients across a range of tumour sites. To explore the role of MRI in lower gastro-intestinal planning, 9 patients were dual scanned as part of a feasibility study to compare target volume delineation using PET-CT and PET-MR images.

Material and Methods: All lower GI tumours requiring a PET-CT for planning purposes were considered eligible for the study. For each patient a PET-CT and PET-MR scan was acquired following a treatment position mask and on the middle chest of the patient for accurate registration. The patients were provided with the relevant anonymised imaging modality.

Results: Nine patients were entered into the study, 6 rectal carcinomas and 3 anal canal carcinomas.

When compared with volumes delineated using CT data, overall, the GTV of the rectal volumes were smaller when delineated on MRI. Due to the small number of anal canal tumours, it is difficult to draw any conclusion.

The similarity index between volumes will also be presented.

Conclusion: This initial evaluation indicates that, overall, MR delineated volumes for rectal tumours are smaller than those created using CT data. This has the potential to impact treatment planning and reduce toxicity. The study highlighted the challenges of using MR data for nodal volume delineation, indicating that a combined modality approach may be optimal. It is acknowledged that extension of this study to a larger population would allow firmer conclusions to be drawn.
required margins. Lorca Marin thermoplastics masks show enough accuracy and stability during complete course of treatment with intensity modulated techniques in head and neck cancer patients.

**EP-2091**

**Establishment of dose reference levels (DRLs) for CT of the head and neck in radiation therapy**

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**Purpose or Objective:** Computed tomography (CT) has become an indispensable tool in oncological imaging. Ionising radiation is cumulative and carries a stochastic risk of malignancy. The implementation of dose reference levels (DRLs) for imaging procedures using ionising radiation is mandated by European Commission directive 97/43 EURATOM. There are currently no dose guidelines for radiation therapy CT of the head and neck (H&N) region. The propose of this research is to establish if variation exists in dose delivered by Irish centres; establish a national DRL for H&N CT scanning in radiation therapy and compare the national DRL with a European sample.

**Material and Methods:** All radiation therapy centres in Ireland and a selection of European centres were invited to complete a dose audit survey for 10 average-sized H&N patients undergoing a CT localisation scan. Data on CTDIvol, DLP, mAs, tube voltage, number of scan phases and scan length was collected.

**Results:** Surveys were returned by five Irish centres, representing a 42% response rate and one European centre. Significant variation was found in the mean DLP, CTDIvol and scan lengths. Based on the rounded 75th percentile of the mean DLP and CTDIvol, the proposed Irish DRL is 1025.41mGy cm and 20.97mGy, respectively. Based on the European survey the DRLs for DLP and CTDIvol were 680.12mGy cm and 21.85mGy, respectively.

**Conclusion:** Variation exists in dose used for H&N CT in radiation therapy. DRLs have been proposed with the aim of dose optimisation for this procedure.

**EP-2092**

**Impact of treatment volumes in loco-regional failure of oral cancer in patients treated with IMRT**

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**Purpose or Objective:** The aim of the study was to analyze the impact of radiation therapy (RT) or concomitant radiochemotherapy (RT-CT) on locoregional control (LRC) in patients affected by oral cancer.

**Material and Methods:** Materials and methods: In this study were enrolled 48 patients with oral cancer diagnoses underwent postoperative RT or exclusive RT-CT treatment. The RT was performed with intensity-modulated radiotherapy (IMRT) technique and LINAC DHX of Varian System. All patients were treated at the department of Radiotherapy, University of Pisa. In patients not treated surgically or operated with major risk factors (positive margins, Extracapsular extension) RT treatment was performed in combination with chemotherapy (CT) or molecular-target therapy. Again patients operated with presence of minor risk factors (positive lymph nodes, lymphatic vascular invasion, perineural invasion) underwent only RT treatment. The volumes were defined as follows: PTV high risk: 66Gy (2.2Gy /fraction) or 63Gy (2.1Gy / fraction) respectively for exclusive RTCT treatment and adjuvant RTCT or RT treatment PTV intermediate risk: 60 Gy (2.0Gy /fraction) PTV low risk: 54Gy (1.8Gy /fraction)

**Results:** From January 2011 to July 2015, 48 patients (mean age 60.9 years; range 33-87) with histologically confirmed diagnosis of oral cancer were treated. At analysis 30 patients (62.5%) underwent surgically treatment and 18 (37.5 %) performed exclusive RTCT treatment. Twentyfour patients were treated with radiochemotherapy or radiotherapy plus molecular-target therapy; in 20 patients (83%) was administered CDDP; in 4 patients (17%) in combination with RT was administered Erbitux. Relapses were divided into local (on T), regional (on N) and locoregional (if the recurrences were on T and N) and classified, after the merger of radiological imaging with radiation therapy planning; in “in field” (within the PTV high risk) and “out field” (without PTV high risk) After a median follow-up of 19.8 months (range 3-62 months), six patients (12.5%) developed local recurrence “in field” and two patients (4.2%) reported locoregional relapse on field. There were not “out field” recurrences. Of six patients relapsed 2 (33.3%) underwent salvage surgery and subsequent CT; 3 (33.3%) underwent second line CT according to Extreme schedule and 1 patient (2%) didn’t any systemic treatment but only support care due to comorbidities and scarce performance status. At the date of abstract submission 3/6 patients died while the others are still alive; overall 5/48 patients (10.4 %) died and only 2 died for cancer-related causes and three for comorbidities.

**Conclusion:** The results of our study confirm the data reported in literature regarding the locoregional recurrences of oral cancer treated with radiotherapy. In field locoregional relapse seems to be the main cause of IMRT treatment failure regardless the patient underwent at surgery treatment or not.

**Electronic Poster:** RTT track: Adaptive treatments in the pelvic region

**EP-2093**

**Drinking instructions does not significantly influence inter-fraction bladder volume stability**

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**Purpose or Objective:** Bladder preparatory protocols are used in prostate cancer (PCa) radiotherapy (RT) prior to simulation (Sim) imaging, and thereafter prior to each fraction of RT. Patients are asked to drink, and hold without voiding, a constant volume of water. Distension of the bladder reduces the volume of the bladder irradiated to high doses. A study of online image-guided radiotherapy (IGRT) in bladder cancer showed that inter- and intra-fraction reproducibility was mostly insensitive to degree of bladder filling. Radiographer students were asked to test the analogous hypothesis for inter-fraction reproducibility in bladder volume over 7 weeks of PCa IGRT.

**Material and Methods:** An audit of PCa IGRT found 96 cases within 1 year of study commencement. 56/96 were locally advanced PCa homogeneously treated with bladder preparation instructions, daily online cone-beam CT (CBCT) verification and 28Gy by sequential boost to gland only following 50Gy to gland plus seminal vesicles by normo-fractionated IMRT. 42 were complete cases in which bladders had been consistently outlined at Sim and 7 CBCTs weekly. 30/42 men agreed to hold 300mL of water each session, but in practice only 26/42 were able to comply throughout treatment. 12/42 men declined the drinking instructions outright.